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Agricultural Production and Trade Prospects through 1990

Edward Cook, Robert Cummings, and Thomas A. Vankai

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Eastern Europe: Agricultural Production and Trade Prospects through 1990.
By Edward Cook, Robert Cummings, and Thomas A. Vankai, International Economics Division, Economic Research Service, U.S. Department of Agriculture. Foreign Agricultural Economic Report No. 195.

Abstract

Eastern Europe, once a growing agricultural import market, has reduced its agricultural imports; prospects for increases are dim through the eighties. Agricultural production, particularly livestock, will grow more slowly through the eighties. Net annual imports of grain will drop to 5.1 million tons by 1985/86, but increase to 5.7 million tons by 1990/91, compared with 13.5 million tons in 1980. U.S. grain exports to Eastern Europe will probably not exceed 3 million tons annually through the eighties. Imports of oilseeds and oilseed meal, in soybean meal equivalent, are forecast at 4.8 million tons by 1985/86 and 5.5 million tons by 1990/91. The U.S. share of this market should reach 35 percent by the mideighties.

Keywords: Eastern Europe, agricultural production, investment, policy, inputs, trade, food consumption, agricultural trade and production outlook.

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Foreword

During the late seventies, the six countries of Eastern Europe covered by this report emerged as a rapidly growing market for U.S. farm products. In 1979, for example, the value of U.S. agricultural exports to Eastern Europe put the region on a par with markets the size of all of Africa or South America. In 1980, Eastern Europe became a \$2-billion market for U.S. agricultural commodities for the first time. Against this background, the reversal that began to appear in 1981 was sudden and disturbing. By 1982, this trade had fallen to levels not experienced for nearly a decade.

In keeping with its mandate for trade analysis, the East Europe-USSR Branch of the International Economics Division of the Economic Research Service (ERS) concentrated resources to examine whether this decline in exports was caused by short-term factors or if it represented more complex changes rooted in the structure of the East European economies. The results of this research are presented here. As always, we welcome reader comments, suggestions, or questions.

**Anton F. Malish, Chief
East Europe-USSR Branch
International Economics Division
Economic Research Service
U.S. Department of Agriculture**

Cover photo: Union Market in Bucharest, Romania. East Europe-USSR Branch, ERS, by A. F. Malish.

Terms and Measures

Terms

Agricultural land—Arable land (cultivated land, gardens, and orchards), meadows, and pastures.

Agricultural trade—Trade in food, fiber, feed, and raw plant and animal materials used to produce food.

Commodity Credit Corporation (CCC).

Council for Mutual Economic Assistance (CEMA): Bulgaria, Cuba, Czechoslovakia, the German Democratic Republic (GDR), Hungary, Mongolia, Poland, Romania, USSR, and Vietnam.

Eastern Europe: Northern countries—Czechoslovakia, the GDR, and Poland.
Southern countries—Bulgaria, Hungary, and Romania.

Measures

Metric units are used throughout:

One metric ton = 2,204.6 pounds

One kilogram = 2.2046 pounds

One hectare = 2.471 acres

Cattle hides: One piece = 22 kilograms

Milk: One liter = 1.031 kilograms

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Summary

The agricultural import market in Eastern Europe (defined in this report as Bulgaria, Czechoslovakia, the German Democratic Republic (GDR), Hungary, Poland, and Romania) declined in 1981 and 1982, and prospects for recovery are dim through the eighties. The area had gained a reputation as a growing market for agricultural exports during the seventies because of official policies to improve national diets and the region's inability to produce adequate feed supplies domestically. Rising debt-service ratios and increasing difficulty in obtaining new credit are major causes of the turnaround.

Eastern Europe had access to a steady supply of hard currency credit from Western commercial and government sources throughout the seventies. However, recent political and economic events in Poland and the maturing of large portions of the debt highlighted Eastern Europe's economic problems and dramatically reduced credit availability. All countries of the region are now restricting domestic consumption and pursuing policies of export expansion.

Import projections through 1990/91 reflect this changed economic environment. In the 1985/86 marketing year, net imports of grain by Eastern Europe are projected at 5.1 million tons, well below the levels of a few years ago. Net imports are projected to increase slightly to 5.7 million tons by 1990/91. Imports of protein meal are expected to reach 4.8 million tons by 1985/86 and 5.5 million tons by 1990/91.

U.S. grain exports to Eastern Europe are expected to decline while those of oilseeds and oilseed meal should increase from the levels of the last few years. Although average U.S. grain exports to the region more than doubled to 6.7 million tons in 1976-80 from 1971-75 levels, U.S. grain exports in 1985/86 and 1990/91 will probably not exceed 3 million tons

annually. This implies a U.S. market share of approximately 33 percent for the rest of the decade, well below the average 44 percent in 1976-80. The determinants of the U.S. share will be the supply of grain for export in the European Community (EC) and Canada (our major competitors in the region), credit availability, and the ratio of wheat to coarse grains in future East European grain imports.

In contrast, the U.S. market share of East European oilmeal imports, which dropped from 36 percent in 1980 to less than 15 percent in 1982, is expected to recover. A recovery of total oilmeal imports in the next few years and reductions in supplier credits from Brazil make a 35-percent U.S. share of the total oilmeal, oilseed, and fishmeal import market (in soybean meal equivalent) appear reasonable by the middle of the eighties. This implies that U.S. exports of oilmeal and oilseeds to Eastern Europe in soybean meal equivalent would be nearly 1.7 million tons in 1985/86 and would reach 1.9 million tons in 1990/91.

Grain has been, and will remain, the principal crop in Eastern Europe. Grain production in Eastern Europe in 1985 is projected at 89.3 million tons, up roughly 14 percent from the 1976-80 average of 78.3 million tons. By 1990, production should reach 96.7 million tons.

Although meat production rose steadily in the sixties and seventies in response to official policies and reached an average of 10.1 million tons in 1976-80, growth rates dropped significantly in the early eighties and were even negative in Poland. Total meat production in 1986 is projected at 10.6 million tons, slightly below 1980 output. Production growth will recover somewhat in the latter half of the eighties with meat production reaching 11.6 million tons by 1991. Milk and egg production will increase through the eighties, leaving milk output 9 percent and egg outturn 14 percent higher by 1991 than average 1976-80 production.

Eastern Europe: Agricultural Production and Trade Prospects through 1990

Edward Cook, Robert Cummings, and
Thomas A. Vankai*

Introduction

Major economic and political events in Eastern Europe—serious foreign debt problems, poor economic performance, and the imposition of martial law in Poland—necessitated a reexamination of agricultural production and trade prospects for the region. As recently as 1980, Eastern Europe was a \$2-billion-plus market for U.S. farm exports. Exports to the region expanded throughout the seventies, and Eastern Europe was seen as a large, growing market for U.S. feedstuffs. However, the virtual cutoff of Western credits in recent years has led Eastern Europe to reorient its economic policy toward reliance on internally generated capital. Domestic consumption has suffered as officials reduced imports. Interested business and Government officials in the United States now look for signs of recovery in the East European export market. This report analyzes current agricultural production and trade policy plus the production and trade outlook through the eighties.

The new economic situation in Eastern Europe has radically altered previous trade prospects, making for example, the Economic Research Service (ERS) grain and oilseed product import projections of only 1-2 years ago too high. The projections in this study reflect the current situation and will help exporters assess market potential in the region for grain and oilseed exports.

Agricultural performance is also a critical issue in all East European countries today, especially in Poland and Romania. The study provides essential historical background on the region's agricultural policy, production, and trade to U.S. Government officials, institutions, and individuals who must analyze current agricultural events in Eastern Europe.

* The authors are agricultural economists with the International Economics Division, Economic Research Service. Thomas A. Vankai directed and coordinated preparation of this report. Karen Campbell assisted in the computation of the statistical data. Pat Reed and Pauline McHeard typed the manuscript. Judith Latham was the principal editor.

Background

The Organization for Economic Cooperation and Development (OECD) recently published a two-volume compendium, *Prospects for Agricultural Production and Trade in Eastern Europe*. This compendium discussed the performance and prospects for agriculture in each of the East European countries. The authors thought that an aggregate treatment of agriculture in Eastern Europe using common headings would be beneficial, especially as the six countries in the OECD report are all members of the Council for Mutual Economic Assistance (CEMA or CMEA). In assessing the potential for production and trade through the eighties, this study reviews the somewhat impressive agricultural developments of the seventies. The outlook for the eighties was influenced by the following factors: the reduction in foreign credit availability throughout the region, a drastic cutback in the rate of investment growth, past production trends, and the virtual collapse of the Polish economy and the severe, long-term problems facing agriculture there.

The authors relied heavily on regionwide data available in the East Europe-USSR Branch of the International Economics Division of ERS. The recent two-volume OECD compendium also provided useful background material and insights into East European agricultural developments and policies. All production and trade estimates are those of the authors. Statistical data in this report are taken from the yearbooks of the respective East European countries and from the CEMA yearbooks (2, 3, 6, 7, 9, 10, 11, 20, 22).¹

Food Consumption

All East European countries made impressive progress during the seventies in improving the diet of their citizens. For example, reported per capita

¹ Italicized numbers refer to items in the reference section at the end of this report.

consumption of high-protein foods (meat and dairy products) rose in all countries, whereas that of grain and potatoes fell. Higher meat consumption became the focal point of a better diet. Between 1971 and 1980, per capita meat consumption rose between 16 percent in Czechoslovakia and 40 percent in Bulgaria (app. table 1).

The fastest rate of increase in per capita meat consumption was for poultry, from 22 percent in Hungary to 220 percent in Poland, where an extensive broiler industry based on imported corn was developed. In 1980, poultry meat accounted for at least 10 percent of per capita meat consumption in the region and reached 25 percent in Bulgaria. Per capita pork consumption also rose significantly—up to 39 percent in the GDR. Despite the increase in poultry meat consumption, pork remained the primary meat in the region, accounting for roughly 50-60 percent of per capita meat intake in 1980, similar to its share in 1971. However, pork's share in Poland fell from 57 to 50 percent because of the large increase in poultry meat consumption. The growth in pork and poultry meat consumption is not surprising, given the greater efficiency of hogs and chickens in converting feed into meat relative to that of cattle and given the traditional preference for pork.

Per capita beef and veal consumption increased little except in Poland. Beef and veal's share of total meat consumption dropped in all countries except Poland. Nevertheless, beef and veal remain the second most frequently consumed meats in Czechoslovakia, the GDR, and Poland.

Lower starch consumption complemented higher protein consumption as per capita intake of cereals and potatoes declined. Per capita cereal consumption fell as much as 11 percent (perhaps more in Romania), with the largest decreases in the less prosperous countries of the south where consumption is highest. Likewise, potato consumption fell significantly. Consumption of the remaining major foods was generally higher at the end of the seventies than earlier in the decade (app. table 2).

Although the region has made advances in improving food consumption, improvement is probably less than the statistics indicate. Food quality is a problem in Eastern Europe, particularly for perishable products, and consumer choices are few. Widespread shortages in Poland and Romania have resulted in food rationing there, setting back progress made earlier in the decade and calling into question the validity of published consumption figures. This situation is especially true in Romania,

which has reported some of the most impressive gains.

Nutritional Content

Although officials have succeeded in improving the quantity of food consumed, consumption patterns still fail to reach the optimum set by nutritionists (17). In the more prosperous countries—the GDR and Czechoslovakia—obesity is reported as a significant health problem. These countries have the highest per capita meat consumption of Eastern Europe, but relatively low fruit and vegetable consumption. Furthermore, fat consumption in Poland and the GDR is excessive, according to nutritionists.

In Bulgaria and Romania, cereal consumption is higher and meat consumption is lower than nutritional norms (17). Plant products, for example, represented over 75 percent of total daily calories consumed in Romania during 1976-80, well above the corresponding shares for Hungary and Poland, and likely compensating for inadequate supplies of animal protein.

Food Supply Trends

Higher levels of per capita food consumption and continuing migration to the cities have raised demand for store-bought processed and prepared food products, thus lessening the importance of onfarm food marketing and processing. Large-scale processing capacity expanded in the food industry as officials sought to meet the higher demand for prepared foods.

This pattern was particularly evident in the livestock sector where large-scale livestock raising and processing enterprises were developed throughout the region. In the GDR, for example, the proportion of government-controlled livestock slaughterings rose. In 1960, onfarm slaughterings accounted for 19 percent of total pork production; by 1978, this share had dropped to 4 percent. The same was true of eggs where the share of total consumption supplied through the state retail trade rose to 64 percent by the end of the seventies, up substantially from levels in the sixties. Even in Poland, where private production remained dominant, the share of self-produced food in total food consumption fell for cereals, meats, edible fats, and milk, among other foods (17).

Nevertheless, rural self-reliance in food consumption is significant, particularly in the southern countries. In Hungary, over 50 percent of rural food consumption is self-produced, similar to the share in Romania and Bulgaria. Further migration to the cities or

urbanization would increase pressures on the food industry, precisely at the time when funds for expansion are becoming scarce. One response to this problem is the current Romanian policy stressing the development of small food processing enterprises close to crop and livestock areas. These facilities are designed to ensure regional food self-sufficiency and to reduce demands on larger food processing plants serving metropolitan areas and the export market.

Retail Price Subsidies

Retail price stability has been an integral part of the diet improvement policy in Eastern Europe. Retail price subsidies have been raised as producer prices have grown and retail prices of major food have

remained unchanged. The artificially low prices contributed to the demand for food as wages rose, and the assortment of competing consumer goods generally remained insufficient and unattractive.

Retail food price subsidies rose during the seventies throughout the region. In Czechoslovakia, these subsidies were estimated to equal 25 percent of retail food prices by the end of the decade. In the GDR, expenditures for food price subsidies were 7.8 billion marks in 1978, close to expenditures on either health and social services or education (\$1 = 2.10 GDR marks in 1978). Government subsidies to the agro-industrial complex in Poland by 1981 accounted for more than 25 percent of the total national budget (28). Subsidies were similarly high in Hungary, where even after price rises in 1979, pork, milk, and dairy product price subsidies ranged from 30 to 50 percent of retail prices.

Although price subsidies are high and wages have risen over the past 10 years, expenditures on food and beverages in Eastern Europe account for much of household disposable income (app. table 3). This is especially so in Bulgaria and Romania where per capita incomes are the lowest in the region, competing consumer goods are scarce, and incomes of collective members are below those of industrial workers, thus constraining nonfood consumer purchases. The share of food expenditures has increased greatly in Poland since early 1982 because of large increases in retail food prices following the imposition of martial law. Food expenditures were estimated to account for 50-60 percent of household expenditures in early 1983.

The share of expenditures for food in Czechoslovakia is the lowest, and Czechoslovakia and the GDR have succeeded in equalizing the share of expenditures on food for urban and rural workers. Relatively high per capita gross national product (GNP) in Czechoslovakia and the GDR, extensive price subsidies, and a significantly better assortment of nonfood consumer goods likely account for the lower share of expenditures on food.

The share of income spent on food could actually rise in the next several years as wage increases will be held down by slow economic growth. More important, the era of stable food prices ended recently as most countries raised retail food prices significantly.

During 1981 and early 1982, average retail food prices increased 35 percent in Romania and 120 percent in Poland, reducing the excessive levels of subsidies in those countries. Meat prices increased



State foodstores like this one in Sofia, Bulgaria, are a major source of food for residents of East European cities. Collective farmer markets are also important retail food outlets.

Photo: A. F. Malish.

10 percent in Hungary, 27 percent in Czechoslovakia, and 64 percent in Romania. Prices of other foodstuffs also increased substantially. The GDR remains the only East European country without officially announced food price increases for two decades.

Agricultural Production

Eastern Europe has approximately 60 million hectares of agricultural land, of which 75 percent is arable (app. table 4). Hungary has the largest share of agricultural land in its total area, followed by Romania and Poland. Hungary also has the largest share of arable land and has the most favorable ratio of population to arable land, followed by Bulgaria and Romania. In all of Eastern Europe, the potential of converting meadows, pastures, and forests to arable land or of draining swampland for agricultural use is extremely limited. However, conversion of agricultural land—2 million hectares between 1960 and 1980—to nonagricultural uses will continue, but probably at a lower rate than in the past because of rigorous controls established by each state. Bulgaria and Romania have somewhat offset losses in other countries by increasing their agricultural land by about 900,000 hectares during the past 20 years.

Crops

Land use in the past two decades has not significantly shifted between fall-sown and spring-sown crops because of constraints imposed by crop rotation and by workload distribution, especially between summer and fall harvest times. However, introduction of new technology, improved management, and increased use of chemicals helped to raise all crop yields, more than offsetting the shortfall caused by the decline in available land.

Grain. Grain is the leading East European crop, covering about 55 percent of arable land. Romania has the highest share; the GDR has the lowest. Climate conditions split Eastern Europe into two distinct grain-producing regions. The principal grains in the northern countries—Czechoslovakia, the GDR, and Poland—are wheat, rye, and barley. In the southern countries—Bulgaria, Hungary, and Romania—the principal grains are wheat and corn. The different climatic influences and cropping patterns often balance losses with gains and tend to explain the region's small variability of production. Effects of adverse weather during the seventies were mitigated by increased use of science and technology and by more drought- and disease-resistant seeds.

The area sown to grain in Eastern Europe declined by 1.2 million hectares between 1961-65 and 1976-80. The rate of decline slowed in each successive 5-year period. The area stabilized in the second half of the seventies with increases in the GDR and Romania offsetting declines in the other countries (app. tables 5 and 6).

Production between 1961-65 and 1976-80 increased by 30 million tons with the highest increase—25.4 percent—occurring between 1966-70 and 1971-75 (app. tables 7 and 8). Although yields displayed a long-term upward trend, annual weather-related fluctuations in individual countries were considerable. Annual variations in aggregate regional output were smaller than in individual countries because of different climate and cropping patterns.

The growth rate in total grain production between 1960 and 1980 was the highest in Czechoslovakia, Hungary, and Romania. The growth rate dropped in all countries between 1971-75 and 1976-80, except Romania. In Poland, it was negative. (Romanian production figures, however, do not discount excessive moisture content and are given in “bunker weight”—the weight of the grain as it comes from the combine. Thus, year-to-year comparisons in Romania and comparisons with yields in other countries are misleading.)

In 1976-80, Hungary produced 4.2 tons per hectare of grain, the highest yield in Eastern Europe. Poland had the lowest yield (2.5 tons per hectare). Hungary's results are associated with the wide use of “production systems,” essentially the large-scale use of modern scientific know-how and advanced technology. Hungary's soil and climate are also well suited for corn, the highest yielding grain. The relatively bad performance in Poland was caused by lack of adequate production incentives for private farmers and inadequate mechanization and inputs available on their small, fragmented farms.

The composition of total grain gradually shifted in favor of wheat, corn, and barley at the expense of rye and oats. Wheat remained the leading crop. Barley overtook rye in quantity of output in the seventies.

Wheat's share of total grain production increased from 30 percent in 1961-65 to 34 percent in 1966-70 and 35 percent in 1971-75 and 1976-80. Wheat's dominance among grains lies in the adoption of high-yielding and more disease-resistant varieties. No similar breakthrough has occurred with rye; consequently, rye growing has been relegated to the less fertile sandy soils. The importance of oats

gradually diminished, corresponding to the replacement of horses with mechanical power. Barley's share of 13 percent of total grain output in 1961-65 increased to 19 percent by 1976-80.

Corn maintained its leading role in the southern countries of Bulgaria, Hungary, and Romania. Corn's share of total grain production in these three countries increased from 48 percent in 1961-65 to 50 percent in 1976-80. Successful improvements of hybrids during the seventies spurred corn production, particularly in Hungary.

Despite the fast growth in production, the East European level of self-sufficiency in grains was only about 90 percent in 1976-80. Successes in increasing grain production in the sixties contributed to greater livestock production in the seventies. Livestock production, stimulated by higher producer prices and relaxed limitations on private livestock holdings, generated hog and poultry populations much larger than planned. Rapid growth in livestock production pushed grain use for feed from an average annual 34 million tons in 1966-70 to 51 million tons in 1971-75 and 61 million tons in 1976-80. Domestic production could not keep pace with this increase in feed requirements, and herd expansion compelled several countries to import more grain.

Forages. Corn, fed green or preserved as silage, is one of the most valued forage crops in Eastern Europe. Corn forage production increased fastest in Poland where the area expanded from 124,000 hectares in 1966-70 to 624,000 hectares by 1976-80 (app. table 9). The expansion of corn silage area in Poland is associated with some land transfer from private to state ownership and with a Government initiative to grow corn for grain. The corn often did not ripen and had to be cut for forage. The production growth rate in the whole region between the last two consecutive 5-year plan periods was 42.6 and 29.3 percent, respectively (app. table 12).

The volume of hay harvested—excluding meadow hay—increased an average 1 percent annually from 1966 to 1980, while the hay-growing area declined 1 percent annually during the same period (app. tables 10, 11, and 12). Neither the growth of production nor the level of mechanical handling of hay kept pace with grains and industrial crops. Excessive losses of nutritional value during the harvesting, handling, and storing of forages also occurred in several countries. The share of forages in total feed rations has, therefore, declined in the past 15 years.

Other Major Crops. Potatoes occupy 8 percent, oilseeds 4 percent, and sugar beets 3 percent of the arable land. The share of gardens, orchards, and vineyards is 6 percent of the arable land (over 9 percent in Bulgaria and Hungary and 2 percent in Poland).

The area sown to potatoes declined by 1 million hectares between 1961-65 and 1976-80, and production declined by 4.5 million tons. Growth in yield did not offset the production loss caused by the decline in sown area. Poland is the region's dominant producer with approximately two-thirds of total East European output. The most rapid decline occurred in Czechoslovakia; only Romania reported production increases.

Potatoes lost some importance because of a gradual decline in per capita human consumption, but they have remained a significant feed. In Poland and the GDR, roughly half the production is fed to livestock. Because potatoes are best suited to sandy soils, potatoes will likely remain an important crop in Poland and the GDR which have large areas of these light soils.

Sugar beets are grown on 3 percent of the region's arable land, but their share of arable land ranges from less than 2 percent in Hungary and Romania to 6 percent in the GDR. Average production increased throughout the past two decades. Yield increases were steepest between 1961-65 and 1966-70 when production grew at 15.4 percent despite a 9.5-percent decline in sown area. Production increased fastest in Hungary and Romania where sugar beets' share among the crops was the lowest. The increase in sugar beet output, however, has not been accompanied by a commensurate increase in sugar production; the higher yielding varieties often had lower sugar content. The growth of sugar beet production also has significance for feed supplies; sugar beet tops and molasses, a byproduct of processing, are particularly important in cattle feeding. In the GDR, production costs of a feed-unit equivalent from sugar beets are 45 percent cheaper than a feed unit from potatoes (17).

Sunflowerseed, rapeseed, and soybeans are Eastern Europe's principal oilseed crops. Oilseeds are dual-purpose crops serving as raw materials for vegetable and industrial oils and as principal sources of protein in livestock feed. In most of the recent years, the region was self-sufficient in vegetable oil with exports and imports in approximate balance. The East European self-sufficiency level for oilmeals processed from domestically produced seeds, however, has been less than 25 percent. In Czecho-

slovakia, the GDR, and Poland, the climate is unsuited to sunflowerseed and soybean production, leaving rapeseed as the only oilseed produced in large volume. Rapeseed, however, has limited food and feed value because of its high erucic acid content. Thus, these countries rely largely on imported oil and oilmeals, while exporting rapeseed and rapeseed oil.

Romania and Bulgaria are the leading East European oilseed producers, with sunflowerseed as their principal oilseed crop. Since 1980, Hungary has caught up with Bulgaria and Romania in sunflowerseed production. Introduction of new, high-yielding varieties and relatively attractive producer prices stimulated production in Hungary.

The sunflowerseed yield increases were spectacular during the sixties in Bulgaria and Romania and during the seventies in Hungary. In Bulgaria, sunflowerseed area and production declined in the seventies. The policy of regional concentration of certain crops and the abandonment of production in some areas caused this decline.

Soybean production in the region remained below 500,000 tons with Romania as the only significant producer. Hungary apparently shelved its earlier intention to expand area from the current 25,000 hectares. Low yield dampened enthusiasm for soybean growing, but this crop may gain popularity if irrigable area expands.

Rapeseed production is relegated mainly to the northern countries of Eastern Europe—Czechoslovakia, the GDR, and Poland—where the climate is unfavorable for soybeans and sunflowers. The rapeseed production trend was up in the region, attaining an annual average of 1.2 million tons in 1976-80.

Minor Crops. Cotton is grown only in Bulgaria. Sown area has been falling since the early sixties, from 78,000 hectares in 1960 to 12,000 hectares in 1980. Cotton growing ceased altogether in northern Bulgaria. Experts found that, even in Bulgaria, the temperature throughout the growing season is favorable to cotton on only 7 percent of the land. Domestic production covers only a token amount of Bulgarian fiber requirements.

Tobacco area and production peaked in 1976 and declined in consecutive years. Bulgaria is the region's leading tobacco producer, with half the East European tobacco output. Tobacco accounts for 13 percent of the total value of agricultural production. Bulgaria grows Turkish-type tobacco on over 80 percent of its tobacco area.

Vegetables and Fruits. Per capita vegetable production is highest in Bulgaria, Hungary, and Romania, all of which export large volumes. Half the vegetable output in Bulgaria is in tomatoes, although tomatoes are grown on only a third of the total vegetable area. Accurate detailed area and production statistics are not available because many producers cultivate vegetables in small private gardens. The growth of vegetable production on large fields accelerated from 5.5 percent between 1966-70 and 1971-75 to 16 percent between 1971-75 and 1976-80. The largest increases were recorded in Romania and the GDR, whereas production in Czechoslovakia declined.

Average annual fruit and nut output increased 20 percent between 1971-75 and 1976-80 following a production decline in 1971-75 from 1966-70. All countries except Bulgaria reported increases. Increases were largest in Poland and Romania as many new orchards likely reached fruit-bearing age during this period. Private growers' contribution to



Hothouse facilities like this one make Romania one of the leading vegetable producers in Eastern Europe.

Photo: Eastfoto.

fruit production has been significant. In Romania, for example, 50 percent of fruits come from private producers (30 percent in Hungary). A recent decline in Bulgarian fruit production is attributed to the relocation of orchards and to the introduction of mechanical production methods associated with a switch to new varieties.

Romania, Bulgaria, and Hungary are the leading grape producers. The production growth between 1961-65 and 1976-80 was 32 percent in these three countries, but the growth rate decelerated in each consecutive 5-year period. In 1976-80, the growth rate was above the regional average by 4 percent in Romania, whereas Bulgaria showed a small decline. This expansion in Romania was in the socialist sector. High-yielding native vines there replaced some of the prevailing low-yielding hybrid vines. Private producers, however, account for 40 percent of grape output in Romania. Grape production is relatively small in Czechoslovakia and the GDR. The climate in Poland is unsuitable for vineyards.

Livestock

Growth in the livestock sector during the sixties lagged behind growth in production of grain and several other important crops because crop production received priority during this period. The livestock sector expanded significantly in the seventies, however, causing a serious imbalance between domestic feed requirements and supply. The most important factors stimulating livestock production were: introduction of new breeds, the spread of artificial insemination, improvements in feeding rations by using a larger share of protein-rich ingredients, enlargement of production operations, increase in privately owned livestock holdings, and a favorable livestock/feed price ratio.

Animal Inventories. The poultry inventory was the first to expand rapidly (app. tables 13 and 14). Expansion began in the sixties, particularly in Bulgaria, Hungary, and Romania. The cattle inventory growth rate increased gradually between 1961 and 1980. The number of beef cattle increased faster than the number of dairy cows. Hog inventories in Eastern Europe grew 24 percent between 1966-70 and 1971-75, with Poland and Romania experiencing the most rapid increases. The growth rate slowed in the second half of the seventies, especially in Hungary. The average sheep inventory remained stable from 1966-70 to 1971-75, but grew about 8 percent by 1976-80. The fastest growth

occurred in the traditionally less important sheep-raising countries—the GDR, Hungary, and Poland.

The sudden popularity of sheep was probably caused by steep price increases for synthetic yarns which made wool more competitive. Greater demand for mutton by the Arab-OPEC nations also promoted the East European sheep industry. The East European countries, responding to this export opportunity, favored sheep raising because sheep require the least concentrates in feeding rations and they can graze in mountainous pastures unsuited for cattle.

In each country's socialized sector the Governments emphasized large, specialized livestock holdings during the seventies to reduce unit production costs and to improve labor productivity. In the GDR, specialized livestock farms were carved from cooperatives, and interfarm associations were created for specialized production. By 1980, 80 percent of the GDR's livestock population was kept in specialized enterprises. The GDR now has several dairy farms with 2,000-6,000 cows, cattle fattening or rearing stations for 24,000 animals, fattening and rearing establishments with 80,000 hogs, and cages for 500,000 laying hens with a 120-million egg-producing capacity. The planned spread of these large-scale enterprises, however, stopped in the last few years either because of lack of investment or because of sanitary and health problems. Bulgaria is the other East European country with very large conglomerates, such as the 20-farm Research Production Association with a stock of 780,000 hogs.

Private livestock holding prevails in Poland. The share of privately owned livestock is even larger than the share of privately owned agricultural land. Even in 1981, after a confrontation between the Polish Government and private farmers and despite the general feed shortage, private farmers increased their cattle and hog holdings, whereas livestock inventories declined sharply on state farms. This shift occurred because the private farmers withheld grain from the State to feed more of their own animals. Farmers with adequate supplies of forages and potatoes responded favorably when procurement prices for livestock were raised substantially. State farms had to liquidate livestock because of the shortfall in domestic and imported grain supply and the elimination of state subsidies for livestock production. The shortfall in imported grain supplies was caused by financial difficulties which forced Poland to cut back feed imports. Czechoslovakia also reduced its hog population to avoid increasing feed imports.

The Hungarian Government in the seventies lifted limitations on privately owned herds and urged cooperative and state farms to assist private livestock producers. Socialized farms often provide young animals and feed to individuals who in turn fatten the animals and market them through socialized enterprises at a prearranged contract price. By 1980, 75 percent of the poultry, more than 50 percent of the hogs, and 25 percent of the cattle were privately owned.

Private livestock holdings gradually gained importance in the rest of Eastern Europe. In Bulgaria and Romania, about 25 percent of the hogs and 40 percent of the poultry are in private hands. In 1975, after the Bulgarians relaxed the limitation on livestock ownership, hog numbers jumped 40 percent within 1 year, partly because of better accounting for previously unreported stock. Two-fifths of the cows in Romania and one-third of the cows in Bulgaria are privately owned. Czechoslovakia has

the lowest share of private livestock holdings. Despite official policy support, an inadequate feed supply hinders significant expansion of private livestock ownership in all the countries.

Poland had 37 percent of the region's 33 million cattle and 33 percent of the region's 64 million hogs in 1980. Since 1977, Romania has surpassed Poland as the regional leader in poultry numbers. Romania, followed by Bulgaria, led the area in sheep numbers.

The GDR has the most cattle and hogs per hectare of agricultural land. Hungary and Bulgaria have the fewest cattle (app. table 15). Bulgaria and Romania have the fewest hogs. Poland has the most cattle per capita; Hungary has the most hogs per capita (app. table 16).

The rapid growth of the livestock sector during 1971-75 slowed in 1976-80 because of the growing financial burden imposed by the heavy dependence



The German Democratic Republic has one of the most developed livestock industries in Eastern Europe. This photo shows specialists judging bulls for the country's breeding stock.

Photo: Eastfoto.

on imported feed. All East European countries were large importers of protein-rich feed although Romania (until 1976) and Hungary were net grain exporters.

Meat Production. Average meat production in the region grew 27 percent from 1966-70 to 1971-75 and 19 percent from 1971-75 to 1976-80 as a result of increased livestock inventories and improved feeding efficiency. The growth rate in the first period was above the regional average in Romania and Hungary; in the second period, growth was above the regional average in Romania, Bulgaria, and the GDR (app. tables 17 and 18).

Meat production figures include live animal exports for slaughter. Live animal exports are very important in Hungarian livestock production because of inadequate meat-processing capacity. Live animals accounted for 25 percent of total Hungarian meat exports in 1980.

Pork is the principal meat in all East European countries. Pork's share in total meat production was 60 percent in 1966-70 and 59 percent in 1976-80. The rapid increase in poultry production raised poultry's share of total meat production from 10 percent to 15 percent during the same period. Construction of "broiler factories," better feed conversion ratios, and private farmers' interest in poultry raising and feeding contributed to the high growth rate.

The growth rate of poultry and pork output was faster than that of beef and mutton in the first half of the seventies. But, in the second half, the growth rate of beef production exceeded that of pork. The rank of countries regarding the produced volume shifted; for example, in 1976-80, Poland became the leading poultry producer surpassing Hungary and Romania, the leaders during 1971-75. Although Poland emphasized poultry production, its pork output remained at the 1971-75 level. A serious crop production shortfall in 1975 caused a feed shortage in Poland in 1976 and, consequently, a cut in hog inventories.

Changes in procurement prices and, more important, the price ratio established between livestock and feed and among the individual livestock products are major Government tools in influencing production choices. For example, Hungary, a surplus grain producer, increased livestock prices at a higher rate than grain prices in the past 3 years and increased poultry and hog prices more than cattle prices. The GDR, relying on grain imports, maintained the price ratio between grains and hogs and poultry, but improved it for cattle.

Compared with the preceding 5-year level, the 1976-80 production of beef exceeded the regional average growth rate of 16.9 percent in Romania, Bulgaria, and Poland. In Hungary, beef production declined slightly in 1976-80 because of unfavorable producer prices compared with other meat prices. The authorities apparently deemphasized beef production because of the loss, caused by trade barriers, of traditional export markets in the European Community (EC).

Among various indicators of livestock productivity is the quantity of pork produced related to the hog inventory. Pork produced (slaughter weight) divided by the beginning year hog inventory yielded 92 kilograms of meat in 1966-70 and 97 kilograms in 1976-80, an improvement of 5.4 percent in 10 years. Productivity was highest in Czechoslovakia in 1966-70 and in Hungary in 1976-80. Productivity improved in the successive 5-year periods in all countries, except Poland (app. table 19).

Hungary ranks first in per capita meat production, and the GDR produces the most meat per hectare of agricultural land, and Romania the least. Per capita meat production (including edible fat and offals, but excluding game and fish) in each country would have covered domestic demand if meat prices had not been subsidized, and thus demand stimulated, and if meat exports had been halted.

Milk and Eggs. Milk production grew fastest during 1966-70, but the growth rate declined later in the seventies because of the reduction of cows in Czechoslovakia and the GDR. Growth was below the regional average in Hungary and Poland. Hungary produced less milk during 1971-75 than during 1966-70. Production recovered during 1976-80 with the help of imported Holstein-Friesian stock and semen. The milk production growth rate during 1976-80 was above the regional average in Romania, Bulgaria, and Hungary.

Milk yield per cow increased gradually in all countries from 1960 to 1980. It ranged from an annual 1,327 liters per cow in Romania to 2,566 liters per cow in the GDR in 1960 (from 1,901 to 3,805 liters in 1980). Milk yield per cow exceeded 3,000 liters annually in Czechoslovakia, the GDR, and Hungary by 1980 (app. table 20).

Egg production rose fastest in Eastern Europe during 1971-75—22.3 percent. However, in Czechoslovakia, the GDR, and Hungary, the growth rate was the fastest during 1966-70. Bulgaria's growth rate was fastest during 1976-80. The large-scale "egg factories" and carefully selected breeds of laying hens

contributed to the impressive growth. Until 1965, the number of eggs per laying hen was largest in the GDR. In later years, Czechoslovakia replaced the GDR in productivity. The growth rate was the highest in Romania, where productivity almost doubled between 1960 and 1980. Poland's egg productivity growth lagged behind that of other countries. In Poland, most laying hens have been privately owned and kept under extensive feeding conditions. Productivity under small-scale management, predominant in Poland, has been much lower than in the countries with largely factory-type operations.

Investment and Inputs

Major investment efforts in each country have facilitated the growth of agricultural production. Investments have helped to significantly expand the use of fertilizers, plant protection agents, agricultural machinery, irrigation, and drainage. Throughout the seventies, increases in capital assets in agriculture, however, have resulted in much less than proportional increases in gross production.

Increases in agricultural investment were large throughout the sixties and first half of the seventies. Only Romania, though, continued a growing trend through the late seventies (table 1).

There has been a long-term decline in the share of agricultural investment in total investment (table 2). This trend has been reversed in recent years in Poland, where an increased share of investment allocated to agriculture is expected to continue through 1985. However, declines in real investment in Polish agriculture are anticipated.

The value of fixed assets in agriculture has grown dramatically in each East European country (table 3). Although the definitions and valuation procedures differ by country, the general tendency during the seventies toward an increasing capital/output ratio is clear.

Land and Labor

Total agricultural land has declined modestly in Eastern Europe, falling 2.7 percent between 1960 and 1980 (table 4). This decline occurred despite

Table 1—Indexes of agricultural investment

Country	1960	1975	1978	1979	1980
	1970 = 100				
Bulgaria	71	140	143	140	149
Czechoslovakia	100	170	188	175	170
GDR	44	115	118	115	114
Hungary	28	105	120	119	109
Poland	38	193	228	227	193
Romania	38	142	198	195	203

Source: (2, 1981, p. 148).

Table 2—Share of agriculture and forestry in total investment

Country	1960	1970	1975	1980
	Percent			
Bulgaria	29.7	15.7	14.6	12.4
Czechoslovakia	16.8	10.7	12.3	10.7
GDR	11.7	12.8	11.7	9.7
Hungary	14.7	21.7	16.0	14.6
Poland	12.6	16.3	13.6	16.9
Romania	19.6	16.4	13.5	13.3

Source: (2, 1981, pp. 141, 145).

Table 3—Indexes of fixed assets in agriculture and gross agricultural production

Country	Fixed assets ¹			Gross production		
	1970	1975	1980	1970	1975	1980
	1970 = 100					
Bulgaria	100	138	197	100	116	121
Czechoslovakia ²	NA	100	138	88	100	111
GDR	100	128	164	100	114	121
Hungary	100	151	202	100	126	141
Poland	100	126	186	100	120	108
Romania	100	157	227	100	137	165

NA = Not available.

¹ For the GDR, constant 1966 prices; for Czechoslovakia, constant 1977 prices; for others, current prices.

² 1975 = 100.

Source: Statistical yearbooks of the respective countries; (2, 1981, p. 191).

Table 4—Agricultural land

Country	1960	1970	1975	1978	1979	1980
	1,000 hectares					
Bulgaria	5,672	6,010	5,955	6,215	6,206	6,185
Czechoslovakia	7,327	7,093	7,004	6,952	6,924	6,851
GDR	6,420	6,286	6,295	6,282	6,280	6,269
Hungary	7,141	6,875	6,770	6,698	6,651	6,627
Poland	20,403	19,543	19,209	19,059	18,991	18,947
Romania	14,547	14,930	14,946	14,964	14,967	14,963
Total	61,510	60,737	60,179	60,170	60,019	59,842

Source: (2, 1981, pp. 196–97).

the successful efforts of some countries to stabilize, or actually expand, their agricultural land by bringing marginal quality lands into production and by initiating land reclamation projects. Poland, Hungary, and Czechoslovakia had the largest declines of agricultural land, about 7 percent each.

The decline is expected to slow during 1981–85. Poland hopes to minimize further losses of agricultural land through full enforcement of new guidelines limiting the conversion, particularly of top-quality soils, to nonagricultural uses. Even so, annual losses are expected to average 30,000 hectares. Official estimates in Czechoslovakia indicate an expected average loss of roughly 14,000 hectares per year through 1990. Romania hopes to further increase its agricultural area by 154,000 hectares during 1981–85, largely through land reclamation projects in the Danube delta.

The size of the agricultural labor force in Eastern Europe declined steadily between 1965 and 1980 (table 5). Bulgaria and Romania, the two countries with the highest share of labor in agriculture in 1965, experienced the largest relative declines. In the past 15 years, Poland has witnessed the smallest relative decline in its agricultural labor force, largely because of the fragmented structure of its farm holdings, which has made the introduction of some laborsaving technology difficult.

The rate of emigration of labor from agriculture has slowed markedly since 1975, except in Poland and Romania. Particularly in the GDR and Hungary, this slowdown may reflect the increasing costliness of pursuing capital-for-labor substitution strategies and the continued movement toward income parity for the agricultural sector.

The agricultural sectors of the East European countries remain labor-intensive compared with West European countries. The share of labor in agriculture in all the East European countries, except the GDR, is quite high in comparison with the 7.7-percent average share in the EC in 1980 (table 6) (21). Agricultural labor statistics for Eastern Europe

Table 5—Agricultural labor force

Country	1965	1970	1975	1980
	Thousands			
Bulgaria	1,770	1,460	1,188	1,037
Czechoslovakia	1,262	1,178	1,024	953
GDR ¹	1,179	997	895	878
Hungary	² 1,386	1,167	1,009	984
Poland ³	5,289	5,210	4,860	4,310
Romania	5,476	4,849	3,837	3,048

¹ Includes employment in forestry.

² Includes employment in forestry and water management.

³ Full-employment equivalent.

Source: Statistical yearbooks of the respective countries. Bulgarian data are from (17, Vol. II).

Table 6—Share of labor in agriculture and forestry in total labor force

Country	1965	1970	1975	1980
	Percent			
Bulgaria	45.3	35.8	28.2	24.5
Czechoslovakia	21.1	18.5	15.7	14.2
GDR	15.1	13.0	11.1	10.5
Hungary	29.7	26.4	22.6	22.0
Poland	41.1	34.6	30.8	26.3
Romania	56.7	49.3	38.1	29.8

Source: (2, 1971, pp. 377–80; 1981, pp. 403–05).

include workers not directly involved in agricultural production, but rather in servicing and repairing machinery, construction work, food processing, and other work. However, the indicators are still relatively high. By 1980, only Czechoslovakia and the GDR had less than 20 percent of their labor forces in agriculture. The number of agricultural workers per 100 hectares of agricultural land in the six nations averaged 18.7 in 1980, compared with an average of 8.6 for the EC (table 7).

Forecasts for the GDR workforce indicate a drop in agricultural labor through 1990 of 100,000-120,000 people, implying an annual rate of decline somewhat faster than in the past 5 years. Projections in Hungary envisage an outflow of labor from agriculture of 13,000-15,000 workers annually during 1981-85 and 10,000-12,000 workers during 1986-90. This projected outflow implies a speedup in labor emigration from agriculture over rates of the past few years.



Laborers in Pest county, Hungary, box grapes for the Budapest retail market.

Photo: Eastfoto.

Table 7—Labor density in agriculture

Country	1965	1970	1975	1980
	Workers/100 hectares of agricultural land			
Bulgaria	30.6	34.3	19.9	16.3
Czechoslovakia	17.6	16.6	14.6	13.9
GDR	18.6	15.8	14.2	14.0
Hungary	19.9	17.0	14.9	14.8
Poland	26.9	26.7	25.3	22.7
Romania	37.0	32.5	25.7	20.4
Eastern Europe	27.0	24.5	21.3	18.7

Officials expect recent economic problems in Poland to halt further declines in the agricultural labor force through 1985 because demand for labor in the rest of the economy has slackened considerably and agricultural incomes are now on a par with industrial incomes. As a sizable number of farmers in Poland apply for pensions during 1981-85, the Government hopes to convince more young people to choose farming as a profession. Some Polish specialists believe that the agricultural labor force could increase by as much as 10 percent to 4.7 million people by 1985 (15).

Agricultural Chemicals

The significant increase in the use of fertilizers and plant protection agents has been a major factor in improving crop yields in Eastern Europe. Fertilizer use per hectare of arable land more than quadrupled between 1960 and 1980 from 55 kilograms to 230 kilograms. The GDR and Bulgaria led in the use of plant protection agents.

Fertilizers. The rate of growth of fertilizer use was particularly strong during the sixties, but slowed somewhat during the first half of the seventies. Increases in fertilizer use since 1975 have slowed considerably; in the GDR and Poland, this slowdown contributed to stabilizing yields of certain major crops (table 8).

Numerous factors contributed to the recent slowdown. Of central importance are the increasing production costs, particularly for nitrogen fertilizers. Second, the USSR has been unable to provide adequate supplies of apatite concentrate (a phosphate raw material), and costs of phosphate ore on the world market have climbed since the mid-seventies. Third, use levels in two countries, Czechoslovakia and the GDR, are so high that with

increasing costs, marginal returns probably do not provide sufficient incentive for further increases in use. Fourth, pressure in Romania to generate hard currency has led it to sacrifice domestic consumption in favor of fertilizer exports.

The amount of fertilizer used per hectare in Czechoslovakia and the GDR compares well with all but the most intensive users in Western Europe. Hungary and Poland are in the midrange of fertilizer use for Eastern Europe. However, in terms of nitrogen use per hectare, Hungary ranks second after the GDR; Poland is next to last ahead of Romania. Poland's fertilizer distribution has traditionally been skewed in favor of the socialized sector, in which roughly twice as much fertilizer is applied per hectare of arable land as in the private sector. For the 75 percent of Polish agriculture that is privately farmed, fertilizer use in 1980 was 191 kilograms per hectare of arable land.

Bulgaria is rapidly approaching the average-use level for the East European region. Nitrogen use per hectare, at 108 kilograms in 1980, was already above average for Eastern Europe. In 1981, a further major increase in fertilizer deliveries to agriculture in Bulgaria was recorded.

Romania remains the least intensive user of fertilizer in the region despite steady increases throughout the last 20 years. This fact also applies to each of the three major nutrients. Romania's priority on export earnings has been important in restraining growth in domestic use.

Eastern Europe is a net exporter of fertilizer, producing 12.4 million tons and consuming 10.5 million tons in 1980 (table 9). However, the region depends heavily on imports of raw and intermediate



Mechanization of crop production has expanded rapidly in Eastern Europe. Nevertheless, manual labor is still used extensively, particularly in Poland.

Photo: Eastfoto.

Table 8—Use of fertilizer on arable land

Country and fertilizer	1960	1965	1970	1975	1980
	Kilograms/hectare ¹				
Bulgaria	34	79	141	157	199
Czechoslovakia	91	152	223	305	334
GDR	188	269	319	370	326
Hungary	29	63	150	276	262
Poland	46	72	158	229	244
Romania	7	25	57	88	106
Eastern Europe	55	91	156	218	230
Nitrogen	18	34	61	84	97
Phosphate	15	27	43	60	65
Potassium	22	30	52	75	68

¹ Active ingredient

Source: (2, 1971 and 1981), statistical yearbooks of the respective countries.

products for the production of nitrogen and phosphate fertilizers. For example, the region depends almost entirely on imported phosphate rock, slightly more than half of which comes from the USSR. Natural gas is now virtually the sole energy feedstock used in producing nitrogen fertilizers. Except for Romania, imports of natural gas by East European countries slightly exceeded domestic production in 1979. Virtually all these imports come from the USSR. Major deposits of potassium salts in the GDR make the region self-sufficient in raw materials for the production of potassium fertilizers. Because not all GDR exports are directed to the region, the USSR also supplies potassium fertilizers.

Table 9—Production and deliveries of fertilizer to farms, 1980

Country	Production				Total deliveries
	Nitrogen	Phosphate	Potassium	Total	
	1,000 tons ¹				
Bulgaria	436	217	INS	653	930
Czechoslovakia	619	412	203	1,233	1,730
GDR	943	370	3,422	4,735	1,637
Hungary	649	257	139	1,045	1,399
Poland	1,290	843	105	2,238	3,635
Romania	1,707	687	57	2,451	1,185
Total	5,643	2,786	3,926	12,355	10,516

INS = Insignificant.

¹ Active ingredient.

Source: (2, 1981).

The East European countries have been self-sufficient in nitrogen fertilizer with only Czechoslovakia being a small net importer. Poland also became a small net importer in 1981. But, Romania is a major exporter of nitrogen fertilizer with such exports approaching 1 million tons by 1980. All countries except Poland and Romania are net importers of phosphate fertilizers. Hungary is the largest of these, importing 129,000 tons, active ingredient, in 1980. In that year, the USSR and Western countries provided roughly equal amounts of phosphate fertilizer to Eastern Europe.

Fertilizer production costs will likely continue to grow. The effects of fertilizer use on yield will depend partly on how efficiently it is applied—for example, improved timing of distribution and application, and coordination with soil testing and analysis. Increasing emphasis will be placed on easy-to-handle granular fertilizers and compound fertilizers. Planned increases in natural gas supplies from the USSR mean there should be no raw materials constraint in the production of nitrogen fertilizers. However, expansion of phosphate fertilizer production could be endangered if the USSR fails to increase its phosphate ore shipments to these countries. Another important factor will be world prices for phosphate ore.

The 5-year plan in Bulgaria calls for nearly doubling fertilizer production by 1985 relative to 1980. Based on past performance, such an increase appears unlikely. Assuming that the price structure is attractive, production will likely expand enough to accommodate 250-260 kilograms per hectare of arable land.

Poland's original target for fertilizer use in 1985 was 320 kilograms per hectare of arable land. The actual level in 1980 was 244 kilograms. The 1985 target has since been lowered to 280 kilograms. Even this lower target may be unrealistic, considering the lack of new capacity planned and the need for major overhaul of many production facilities. The Polish Minister of Agriculture has voiced doubt about the target, citing projections of fertilizer use in 1985 of 260 kilograms per arable hectare, just 6 percent above the 1980 level (14).

Continued emphasis on fertilizer quality rather than quantity is expected in Czechoslovakia and the GDR. Fertilizer use may increase only modestly. The Hungarian Government will need to provide incentives to encourage cost-conscious farm managers to purchase available fertilizer and reverse the downward trend in use of the past few years. Such a Government commitment could spur fertilizer use to exceed 300 kilograms per arable hectare by 1985.

Romania could increase nitrogen fertilizer use by sacrificing some nitrogen fertilizer exports. The relatively low fertilizer intensity in Romania would seem to indicate continued large marginal returns to its use. A larger share of potassium will become necessary as Romania expands its fertilizer use.

Plant Protection Agents. The use of plant protection agents (PPA's) in Eastern Europe expanded greatly during the seventies, especially in Romania, the GDR, and Bulgaria (table 10). Supplies in Poland, however, improved little over the decade. No information in terms of active ingredients is available for Hungary and Czechoslovakia. In terms of raw weight, Hungarian PPA production increased 41

percent between 1970 and 1980, from 44,000 to 62,000 tons.

Romanian data on PPA use per hectare are based on domestic production and could understate actual use levels in 1975 and 1980 when Romania was a net importer of these products. The Bulgarian series is also based on production data. In Bulgaria, between 1975 and 1980, PPA trade on a raw weight basis was roughly in balance.²

The GDR continues to be the most intensive East European user of PPA's. The apparent low priority on PPA supplies to agriculture in Poland has probably contributed to that country's poor agricultural performance in recent years.

Most countries of the region are net importers of PPA's on a raw weight basis (table 11). Eastern Europe imported 92,200 tons of PPA's while exporting 55,300 tons in 1980 (this figure excludes the GDR which reports trade only on a value basis). Romania and Hungary were the largest net importers, followed by Poland and Czechoslovakia. Bulgaria nearly balanced its trade while, in value terms, the GDR was a large net exporter. Hungary and Poland have relied on Western countries for over half their PPA imports, while the share for Bulgaria has been roughly a third.

Information on plan targets for PPA's is scarce. Recently established targets in Poland call for a doubling of PPA use per hectare of agricultural land to 1 kilogram by 1985 and a further increase to 1.5-2.0 kilograms by 1990 (23). Even if these major increases are realized, PPA use in Poland will

² Bulgaria provides information on deliveries of "chemical agents" to agriculture, but this series probably includes chemical feed additives.

Table 10—Use of plant protection agents on agricultural land

Country	1970	1975	1980
	Kilograms/hectare ¹		
Bulgaria ²	2.43	3.20	3.05
GDR ³	2.95	3.57	4.31
Poland ³	.39	.58	.49
Romania ²	1.66	2.40	2.65

¹ Active ingredient.

² Based on total production data.

³ Based on total use data.

Source: Statistical yearbooks of the respective countries.

Table 11—Trade in plant protection agents, 1980

Country	Imports	Exports
	1,000 tons (raw weight)	
Bulgaria	14.0	13.6
Czechoslovakia	15.0	11.6
GDR ¹	NA	NA
Hungary	26.7	11.7
Poland	12.0	9.6
Romania	24.5	8.9
Total ²	92.2	55.3

NA = Not available.

¹ 1980 PPA imports in terms of value totaled the ruble equivalent of \$39.9 million while exports were \$97.5 million (1 ruble = \$1.54).

² Excluding the GDR.

Source: (2, 1981; 3, 1981).

remain well below levels already attained by other East European countries.

Plans in Hungary call for raising average utilization 40-50 percent by 1990. But, balance of trade problems and a shortage of investment resources may limit expansion to about 30 percent (17).

Agricultural Machinery

The large increase in the number of tractors and grain combines during the sixties slowed considerably during the seventies (tables 12 and 13). An exception was Poland, which more than doubled inventories of these two types of machines between 1970 and 1980. Romania has also continued to expand its tractor stock. The slowed growth in tractor numbers in the other countries has been offset by higher average horsepower. Total available horsepower will continue to expand for all East European countries, although Poland is unlikely to maintain its high growth rate of the last decade because of a decline in investment funds.

Mechanization of small grain harvesting is virtually complete in all countries, except Poland. Mechanization of corn harvesting is also nearly complete in the socialized sectors of the main corn-producing countries—Bulgaria, Hungary, and Romania. Emphasis on improving design and work capacity will likely keep total grain combine numbers stable, except in Poland where further increases are expected. Crops less than fully mechanized in Eastern Europe include vegetables, tobacco, sugar beets, potatoes, grapes, and some fodder crops.

Table 12—Tractor numbers

Country	1960	1965	1970	1975	1980
	1,000 units				
Bulgaria	25.8	42.0	53.6	64.7	62.0
Czechoslovakia	74.9	125.0	136.0	142.0	137.0
GDR	70.6	124.0	149.0	140.0	145.0
Hungary	41.0	64.2	68.4	62.1	55.5
Poland	62.8	124.0	231.0	411.0	620.0
Romania	44.2	81.4	107.0	120.0	147.0

Source: (2, 1971, p. 257; 1981, p. 237).

Table 13—Grain combines

Country	1960	1965	1970	1975	1980
	1,000 units				
Bulgaria	7.0	6.9	9.3	10.3	9.7
Czechoslovakia	6.3	11.8	16.4	19.9	17.8
GDR	6.4	15.4	17.9	11.2	13.6
Hungary	4.2	8.8	11.8	13.9	14.1
Poland	3.1	5.3	14.0	21.2	39.3
Romania ¹	18.4	40.0	49.8	41.1	40.3

¹ Romanian figures include a large number of tractor-drawn combines.

Source: (2, 1971, p. 257; 1981, p. 237).

Mechanization of livestock production is much less advanced than that of crop production. This relative underdevelopment partly reflects the costliness of modern housing facilities and the recent less-than-expected return on livestock investments. Mechanization is particularly underdeveloped for private livestock production, which accounts for a significant share of total livestock production in most East European countries.

Tractors continue to play an important role in transporting agricultural commodities. A Bulgarian study recently indicated that the cost of agricultural transportation per ton per kilometer in that country was twice as expensive by tractor as by truck. Truck transportation for agriculture in Bulgaria has received inadequate attention in terms of investment and new deliveries. In 1979, 41 percent of trucks employed in agriculture were fully depreciated while another 26 percent were within 3 years of this limit (16). The large private sector in Poland is forced to rely almost entirely on tractors for its mechanized agricultural transportation, resulting in excessive wear and fuel use. Czechoslovakia plans to replace 27,000 tractors with 10,000 special-purpose trucks by 1985. In Czechoslovakia and the GDR, truck numbers in agriculture roughly doubled during the seventies.

Eastern Europe is a net exporter of both tractors and total agricultural machinery (table 14). Agricultural machinery exports in 1980 exceeded imports by 200 million rubles for the East European region except Romania. The GDR was the largest net exporter; Poland was the largest net importer of agricultural machinery. Eastern Europe exported 90,000 tractors, while importing 36,000 tractors in 1980. Romania and Czechoslovakia were the largest net exporters of tractors, whereas Poland and Hungary were the largest net importers. Most trade in agricultural machinery is conducted within CEMA.

Irrigation and Drainage

Irrigable area for Eastern Europe increased approximately 84 percent in the seventies. Romania, the GDR, and Czechoslovakia have led in the expansion of irrigable land (table 15).

Irrigation systems are not always fully utilized. Actual area irrigated in Bulgaria has ranged between 78 and 88 percent of irrigable land; the corresponding share in Hungary has been 50 percent. Reasons for this low rate of utilization include problems with technical maintenance of systems, improper use of labor resources, lack of water supplies, and absence of financial incentive.

About 20 percent of Romania's 1980 corn and 15 percent of its wheat were sown on irrigable land. Figures for other major crops were: sunflowers, 22 percent; sugar beets, 29 percent; soybeans, 46 percent; and vegetables, 57 percent. The share of major crops sown on Bulgaria's irrigable land in the socialized sector in 1979 was: corn, 37 percent; wheat, 20 percent; sugar beets, 39 percent; vege-

Table 14—Trade in agricultural machinery, 1980

Country	Tractors		Agricultural machinery	
	Imports	Exports	Imports	Exports
	1,000 units		Million rubles ¹	
Bulgaria	2.7	4.7	159	178
Czechoslovakia	1.3	25.6	222	251
GDR	7.0	2.1	226	533
Hungary	9.3	.1	228	225
Poland	16.1	4.3	328	172
Romania	INS	52.7	NA	NA
Total	36.4	89.5	1,163 ²	1,359 ²

NA = Not available.

INS = Insignificant.

¹ 1 ruble = \$1.54.

² Excluding Romania.

Source: (2, 1981, pp. 343-400).

Table 15—Irrigable land, 1980

Country	Irrigable land			Percentage of arable land		
	1970	1975	1980	1970	1975	1980
	1,000 hectares			Percent		
Bulgaria	1,021 ¹	1,128	1,197	22.6 ¹	26.0	28.7
Czechoslovakia	141 ¹	234	313	2.6 ¹	4.5	6.0
GDR	350	600	960	7.3	12.2	19.1
Hungary	465 ¹	487	444	8.3 ¹	8.9	8.3
Poland	425	491	519	*	*	*
Romania	665	1,424	2,222	6.3	13.6	21.2

* = Not applicable. Most Polish irrigation is on meadows and pastures.

¹ 1971 data.

Source: Statistical yearbooks of the respective countries; (1, 8, 30).



Although rare in U.S. agriculture, crawler tractors like these in Bulgaria make up much of the East European tractor fleet.

Photo: A. F. Malish.

tables, 63 percent; fruits, 44 percent; grapes, 29 percent; and sunflowers, 8 percent.

Expansion of irrigable land in Eastern Europe will continue to slow for the next few years. Reconstruction and modernization of existing systems paired with the high cost of new systems will contribute to the slowdown. In the GDR, where sprinkler systems account for more than half the irrigation, introduction of new irrigable land peaked in 1977 at 85,000 hectares, then declined to 48,000 hectares in 1980 (20). This slowdown is probably part of a general economic policy of reducing new investment projects because of budgetary constraints.

Romania's 1981-85 draft plan calls for new irrigation on 700,000 to 1 million hectares, of which 195,000 hectares were planned for 1981. However, the Government declared a moratorium on new construction projects during 1981/82 so that irrigation systems currently under construction could be

commissioned and older ones could be repaired. The increase in irrigable area in 1980 was less than 2 percent, quite small in comparison with the trend of the past 20 years, when irrigable area increased an average of 16 percent annually. Problems with silting of canals and salinization of soils have led to much unused irrigation capacity (17). Recent relatively poor soybean yields in Romania, even with nearly half the crop on irrigable land, attest to these problems.

Bulgaria's new 5-year plan targets call for an additional 85,000 hectares of irrigable land by 1985 and modernization work on 100,000 hectares of existing systems.

Drainage requirements in several countries, particularly the northern ones, are fairly large. Poland's area with drainage facilities exceeded 3.8 million hectares by 1980 or 20 percent of agricultural land, compared with 2.95 million hectares in 1970. Wide-



According to *Ikonomika na selskoto stopanstvo* (Rural Economics), some 14 percent of the Bulgarian farm labor force is over retirement age compared with only 3 percent in the industrial labor force.

Photo: A. F. Malish.

spread flooding during 1980 underscored the need for a major extension and improvement of drainage facilities in Poland. Experts indicate that an additional 3.5 million hectares of agricultural land need improvements, most of which involve drainage (12).

The original plan targets in Poland called for land improvement on an additional 700,000 hectares during 1981-85 and modernization of drainage and irrigation facilities on 180,000-200,000 hectares (24). These figures imply a major increase in the rate of land improvement from current levels and some agricultural specialists in Poland doubt that investment resources will be available to meet the targets (25).

Romania's land with drainage facilities amounted to nearly 2.7 million hectares in 1980 (18 percent of agricultural land) compared with just 1.2 million hectares in 1970. The 5-year plan calls for an extension of drained area by 830,000 hectares through 1985. Czechoslovakia's drained area has been expanding by 50,000-60,000 hectares a year. Drained area is estimated at 1.1 million hectares, or 16 percent of agricultural land. Such newly introduced drained area in the GDR totaled 60,000 hectares in 1980, but has been falling fairly steadily from its peak of 115,000 hectares in 1971. Expansion in drained area in Hungary has slowed, currently amounting to roughly 45,000 hectares annually compared with 75,000-85,000 hectares during the sixties.

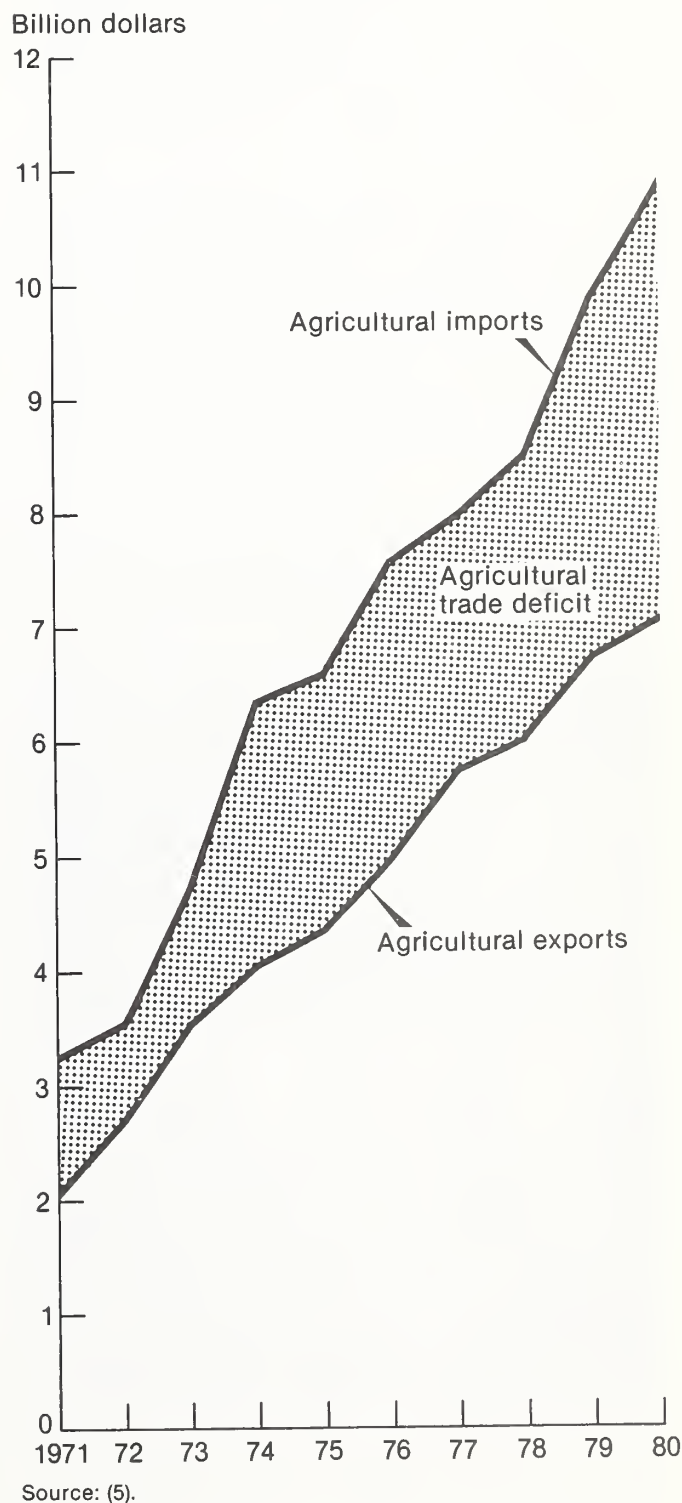
Foreign Trade

Eastern Europe's agricultural trade balance deteriorated throughout the seventies as consumption of agricultural products far exceeded domestic production. Several years of bad weather constrained already inadequate domestic capabilities, particularly for livestock feed production, culminating in a record agricultural trade deficit of \$3.8 billion in 1980. This level was almost 3.5 times the deficit in 1971 (fig. 1). The deficit in agricultural trade (app. table 21) contributed greatly to the total trade deficit all East European countries experienced throughout most of the decade (app. table 22).

The agricultural trade deficit in 1971-75 accounted for 66 percent of the total trade shortfall, dropping to 49 percent in 1976-80. Foreign trade holds an important position in the economies of Eastern Europe, equivalent to an estimated 20-50 percent of gross national product, and large foreign debts have been contracted to finance trade deficits. The net hard currency debt of the region was approximately \$56 billion by the end of 1982 with Poland, Romania, and the GDR the largest debtors.

Figure 1

Eastern Europe's Agricultural Trade, 1971-80



Availability of foreign credits to facilitate agricultural imports to Eastern Europe has been a determining factor in the overall level of sales. For example, 40 percent of U.S. agricultural exports to Eastern Europe in FY 1981 (Oct. 80-Sept. 81) were financed through credit guarantees of the Commodity Credit Corporation (CCC), and fully 95 percent of such exports to Poland, the largest U.S. farm market in FY 1981, were CCC-financed.

However, requests for rescheduling loan repayments and political events in Poland have underscored the economic problems of the region, making Western lenders more cautious. Requests for rescheduling have become an annual occurrence for Poland and Romania. Much reduced credit availability and growing repayment obligations have placed increasing pressure on all countries to hold back imports, including agricultural imports.

Agriculture's Share

Agricultural trade in 1980 accounted for only 11 percent of total trade in Eastern Europe, down slightly from the 1971-75 average. This share has dropped most significantly for Czechoslovakia, Poland, and Romania where trade in industrial goods has grown.

The share of agricultural exports in total exports was just below 9 percent in 1980, compared with the 10.6-percent average in 1971-75. This indicator declined for most countries during the seventies, most significantly for Poland and Romania where a combination of increased domestic food consumption, disappointing agricultural production, and higher exports of industrial products have reduced agriculture's share. Agricultural products during the seventies consistently accounted for 23-30 percent of all exports from Hungary, the region's largest agricultural exporter (fig. 2).

The share of agricultural imports in total imports also declined modestly to just under 13 percent in 1980. Declines occurred in all countries, but were most significant in Bulgaria, Czechoslovakia, and Romania. This decline in agriculture's share likely represents an increase in the value of nonagricultural imports (fig. 3).

The agricultural trade of Bulgaria and Hungary are successful exceptions to the East European rule. Favorable production conditions, good management, particularly in Hungary, and a commitment to export rather than to consume have boosted agricultural trade surpluses.

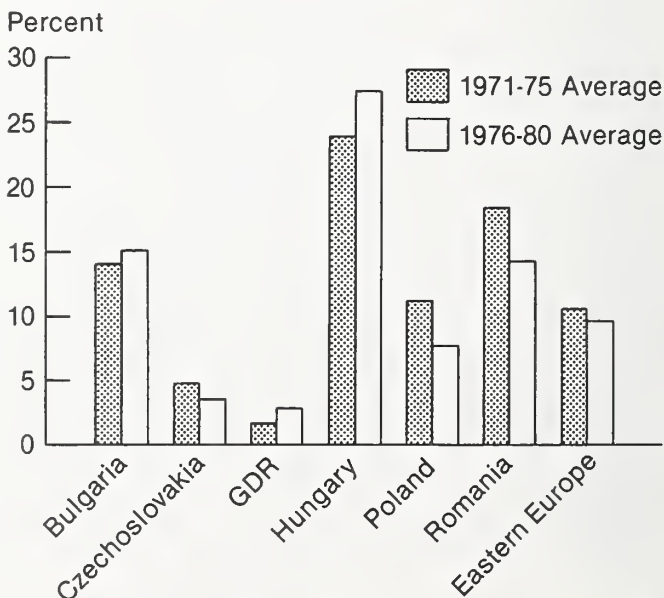
Agricultural Imports

Grain and livestock feed dominate East European agricultural imports. In 1980, imports of grain (Standard International Trade Classification—SITC 04), feeding stuffs (SITC 08), and oilseeds (SITC 22) accounted for 41 percent of all imports, ranging from 22 percent in Hungary to 51 percent in Poland. The share of these imports rose during the seventies, from 24 percent in 1971 to an average 39 percent in 1978-80 (app. table 23). Imports of fibers, beverages, fruits and vegetables, sugar and honey, and coffee, tea, and spices were other major agricultural imports.

Livestock Feed. Grain imports in 1976-80 averaged 15 million tons, 52 percent above the 1971-75 average (app. table 24). Higher grain imports resulted from increased purchases of coarse grains as wheat imports have remained relatively stable, averaging 4.5 million tons in 1971-75 and 5 million tons in 1976-80. Significant increases also occurred with other feeds. Average oilseed meal imports were up 38 percent to 3.86 million tons, and average oilseed imports of 601,000 tons were 44 percent above average 1971-75 imports (app. table 25).

Figure 2

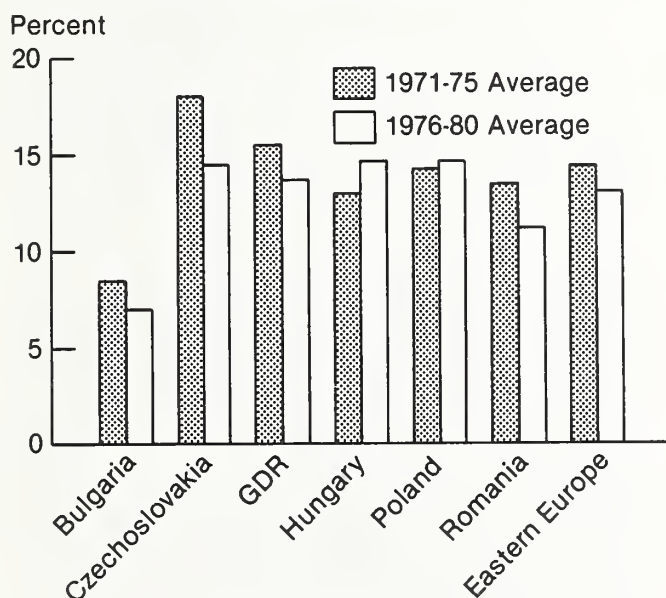
Agriculture's Share of Total Exports, 1971-75 and 1976-80 Averages



Sources: (5), and statistical yearbooks of the respective countries.

Figure 3

Agriculture's Share of Total Imports, 1971-75 and 1976-80 Averages



Sources: (5), and statistical yearbooks of the respective countries.

Increased grain imports are linked to a change in the pattern of suppliers. The USSR supplied an average 38 percent (3.8 million tons) of the region's grain imports in 1971-75 (app. table 26). Most of these imports were wheat. The United States supplied 27 percent (2.7 million tons). By 1976-80, the USSR had become a negligible supplier whereas the United States, on the strength of higher coarse grain imports, had increased its market share to 44 percent (6.7 million tons).

Other major supplies came from the European Community (EC), from Canada, and from intra-East European trade. The share of grain imports covered by intra-East European trade declined through the seventies to less than 4 percent of imports in 1980. However, EC and Canadian suppliers increased their market share. The EC provided 12 percent of average annual East European grain imports in 1971-75. The EC share, although up only marginally in 1976-80 over 1971-75, grew to an average 18 percent in 1978-80. Canadian growth was more impressive. From supplying just over 4 percent of imported grain in 1971-75, Canada was responsible for 9 percent of the region's imports in 1976-80. The most startling change is the absence of the USSR as a significant grain supplier in 1976-80. Higher

Soviet grain consumption and disappointing production at the end of the seventies account for this change.

Oilseed and oilmeal imports also expanded in the seventies with the United States as the major supplier. Supplier data on trade in oilseeds and oilseed products is less complete than that for grain, but the U.S. importance as a supplier is evident. Soybeans account for approximately three-quarters of oilseed imports and the United States is the major supplier of soybean imports by Eastern Europe. The U.S. share of this market increased in the seventies, from an average 77 percent (151,000 tons) in 1971-75 to an 80 percent average (366,000 tons) in 1976-80.

The trend in the seventies was less favorable for the U.S. share of the oilseed-meal import market. Although U.S. suppliers steadily increased their market shares from an average 25 percent (714,000 tons) in 1971-75 to an average 34 percent in 1976-80 (1.3 million tons), the growth rate was not so rapid as that of Brazil, the United States' major competitor. By gaining market shares from the EC (and indirectly from the United States as crushed U.S.



Offspring like these of imported American holsteins have greatly improved the efficiency of the Hungarian cattle industry.

Photo: T. A. Vankai.

soybeans represent a significant portion of EC meal exports to Eastern Europe), Brazil held an average 36 percent of the market in 1976-80, up from 15 percent in 1971-75. Brazil made extensive use of bilateral trade agreements throughout the region and of supplier credits extended to Poland to expand its market share.

Higher feed requirements in the seventies raised the level of dependence on foreign suppliers, particularly from the West (app. table 27). Just under 9 percent of all grain consumed in Eastern Europe was imported in 1971-75. This figure had increased to nearly 13 percent by 1976-80. The GDR and Poland significantly increased their reliance on foreign grains. The region depends even more heavily on imported oilmeals. Imports accounted for approximately 75 percent of oilmeal consumption by the midseventies.

Roughly 30 percent of Poland's meat production depended on imported feed by 1980. Similarly, 21 percent of the GDR's livestock production in 1974-78 was based on imported feed in contrast to 17 percent in 1967-71.

Other Agricultural Products. Imports of the other major agricultural products—vegetable oil, cotton, hides, skins, tobacco—remained stable in the seventies. Meat, meat products, and sugar imports fell (app. table 28).

The region is virtually self-sufficient in vegetable oil production with much of the trade among East European countries. However, Eastern Europe depends on imports for almost all its cotton needs; the USSR is the major supplier. Cuba supplied almost all the sugar imports, whereas tobacco imports came from Greece, North and South America, and Western as well as Eastern Europe. Western Europe is the major supplier of meat and meat products, although source data are incomplete. Australia, Argentina, and the United States are the major suppliers of hides and skins.

The trend in agricultural imports for most countries during the seventies has been toward raw and semifinished imports, largely resulting from a general expansion of the food industry as part of the diet improvement policy.

Agricultural Exports

The growth in the value of agricultural exports, at current prices, kept pace with that of agricultural imports in the seventies. These exports increased 111 percent in 1971-75 and 42 percent in 1976-80

versus 105 percent and 44 percent, respectively, for agricultural imports. However, export growth was not sufficient to prevent a widening agricultural trade deficit.

Live animals, meat and meat preparations, cereals and preparations, and fruits and vegetables are the main export commodity groups (app. table 29). In 1980, these four groups accounted for 54 percent of the region's agricultural exports, ranging from 36 percent in Czechoslovakia to 94 percent in the GDR. Hungary is the largest agricultural exporter in Eastern Europe, followed by Romania and Bulgaria.

Hungary is the leading exporter of meat, meat products, and oilseeds. Romania holds a lead over Hungary in grain and vegetable oil exports. Bulgaria is the main exporter of tobacco, and Czechoslovakia and Poland are the leading sellers of sugar (app. table 30).

Grain exports rose only marginally—from an annual average of 3.1 million tons in 1971-75 to an average 3.5 million tons in 1976-80 because of increased grain consumption. Average exports of oilseeds rose only 12 percent between 1971-75 and 1976-80; average exports of vegetable oil and tobacco remained unchanged; and average exports of sugar fell 12 percent as a result of disappointing sugar beet production in Czechoslovakia and Poland.

The one bright spot in the region's agricultural exports was in meat and meat products. These exports jumped almost 40 percent to an annual average of 900,000 tons in 1976-80. Eastern Europe is a traditional net exporter of these commodities, and all countries except Poland recorded increased exports in the seventies.

Data on the destination of East European agricultural exports are incomplete. But, the traditional pattern has been to export processed food products to the West and to sell raw agricultural products to fellow CEMA members. The USSR has recently emerged as a significant market for meat and meat products and live animal exports, as has the Middle East. The Middle East has also recently joined Western Europe as a major destination for East European sugar. Western Europe remains a major market for the region's agricultural exports and is the single largest market for GDR agricultural exports, most of which go to West Berlin.

Roughly half of Hungary's agricultural exports are destined for CEMA, with the remainder shipped to the West. The USSR is Hungary's major agricultural customer, taking 25 percent of the country's exports

and 50 percent of those shipped to CEMA. However, Hungary's agricultural exports to CEMA make up only 15 percent of total Hungarian exports to those countries, whereas agricultural exports to the West, overwhelmingly of animal origin, account for more than 30 percent.

Hungary's agricultural exports are dominated by processed products, with much of the value accounted for by livestock (17). In 1978, 40 percent of all live poultry, 45 percent of all live cattle and beef, and 67 percent of all live sheep produced were exported.

Crops dominate Bulgarian agricultural exports, although the country is a net exporter of meat. Tobacco is the major export commodity followed by vegetables, fresh and preserved fruit, and animal products. The USSR is the major purchaser of Bulgarian meat and tobacco, and the Middle East is the most significant market for live sheep exports.

Agricultural Prospects

Agricultural production in the region will grow more slowly through the eighties than during the

seventies. Rising production costs and the failure to more efficiently use available capital resources are expected to constrain production. Fertilizer use will continue the trend of recent years and expand only slowly through the eighties. Land improvement work, particularly irrigation, is expected to be carried out on smaller areas than in the past. The increasing debt-payment problems of most of these countries will keep imports of grain and oilseed meal below the peak levels of 1980 and 1981. Only small changes in food consumption patterns in most countries are expected in the eighties.

Crop Production

East European grain production in 1985 is projected at 89.3 million tons, up roughly 14 percent from the 1976-80 average of 78.4 million tons (table 16). Greater priority on domestic grain production is expected to lead some countries of the region to expand area sown to grain during the 1981-85 plan period. In addition, advances in seed development, greater attention to plant protection agents, a sharper focus on the quality of industrial inputs, and better management, particularly in improving the

Table 16—Selected crop projections, by country, 1985

Crop	Unit	Bulgaria	Czechoslovakia	GDR	Hungary	Poland	Romania
Grain:							
Area	1,000 ha.	2,194	2,600	2,585	2,900	8,100	6,275
Yield	Tons/ha.	4.28	4.19	3.95	4.88	2.72	3.60
Output	1,000 tons	9,400	10,905	10,200	14,160	22,000	22,600
Rapeseed:							
Area	1,000 ha.	NP	105	125	60	340	NP
Yield	Tons/ha.	NP	2.33	2.48	1.58	2.0	NP
Output	1,000 tons	NP	245	310	95	680	NP
Sunflowerseed:							
Area	1,000 ha.	275	NP	NP	290	NP	500
Yield	Tons/ha.	1.87	NP	NP	1.90	NP	1.67
Output	1,000 tons	515	NP	NP	550	NP	835
Soybeans:							
Area	1,000 ha.	90	NP	NP	30	NP	315
Yield	Tons/ha.	1.40	NP	NP	2.20	NP	1.05
Output	1,000 tons	126	NP	NP	66	NP	330
Potatoes:							
Area	1,000 ha.	40	188	494	55	2,100	290
Yield	Tons/ha.	10.50	17.55	18.02	17.45	20.95	15.60
Output	1,000 tons	420	3,300	8,900	960	44,000	4,525
Sugar beets:							
Area	1,000 ha.	63	220	260	125	500	260
Yield	Tons/ha.	27.46	36.00	30.50	38.80	32.00	24.62
Output	1,000 tons	1,730	7,920	7,930	4,850	16,000	6,400

NP = No projection. Production has been insignificant or nil.

timing of cultivation, will contribute to higher grain, as well as other crop, yields. Grain production in the second half of the eighties is expected to expand at a somewhat slower rate, reaching 96.7 million tons by 1990 (tables 17 and 18). Romania and Bulgaria are projected to have the most rapid increase in grain production in the eighties compared with average production in 1976-80.

Potato area will continue its long-term decline through 1990, but at a noticeably slower rate than during the seventies. Potato production is projected at 62.1 million tons in 1985 and 61.6 million tons in 1990, compared with an annual average of 62.3 million tons for 1976-80. This average was greatly affected by the disastrous potato harvest of 1980. The importance of potatoes as a feed crop and favorable yields are expected to minimize further reductions in area in Poland and the GDR. Production of sugar beets in 1985 is projected at 44.8 million tons, which is 11 percent above the 1976-80 average of 40.2 million tons, but only slightly exceeds the record of 44 million tons of 1977. By 1990, sugar beet production in Eastern Europe is projected to reach 47 million tons.

Sunflowerseed production in 1985 is projected to be roughly 1.9 million tons, equal to the record of 1981, while expanding modestly to slightly over 2.0 million tons by 1990. Rapeseed production should rebound to 1.3 million tons by 1985 and approach,

Table 18—Production of selected crops, 1976-80 average, and projections for 1985 and 1990, Eastern Europe

Crop	1976-80 average	1985	1990
	1,000 tons		
Grain	78,375	89,265	96,690
Rapeseed	1,169	1,330 ¹	1,460 ¹
Sunflowerseed	1,532	1,900 ²	2,030 ²
Soybeans	447	522 ²	585 ²
Potatoes	62,267	62,105	61,595
Sugar beets	40,221	44,830	47,005

¹ Bulgaria and Romania are not included because production will remain insignificant.

² Czechoslovakia, GDR, and Poland are not included because production will remain insignificant.

Table 17—Selected crop projections, by country, 1990

Crop	Unit	Bulgaria	Czechoslovakia	GDR	Hungary	Poland	Romania
Grain:							
Area	1,000 ha.	2,100	2,600	2,600	2,800	8,000	6,150
Yield	Tons/ha.	4.84	4.47	4.18	5.33	2.99	4.10
Output	1,000 tons	10,170	11,610	10,860	14,920	23,930	25,200
Rapeseed:							
Area	1,000 ha.	NP	115	125	60	360	NP
Yield	Tons/ha.	NP	2.43	2.60	1.67	2.10	NP
Output	1,000 tons	NP	280	325	100	755	NP
Sunflowerseed:							
Area	1,000 ha.	270	NP	NP	290	NP	500
Yield	Tons/ha.	2.00	NP	NP	2.12	NP	1.75
Output	1,000 tons	540	NP	NP	615	NP	875
Soybeans:							
Area	1,000 ha.	100	NP	NP	35	NP	315
Yield	Tons/ha.	1.60	NP	NP	2.29	NP	1.10
Output	1,000 tons	160	NP	NP	80	NP	345
Potatoes:							
Area	1,000 ha.	40	170	450	55	1,950	280
Yield	Tons/ha.	11.50	18.50	18.50	19.00	22.56	16.50
Output	1,000 tons	460	3,145	8,325	1,045	44,000	4,620
Sugar beets:							
Area	1,000 ha.	60	215	260	123	490	275
Yield	Tons/ha.	31.67	37.00	32.00	39.84	34.69	25.20
Output	1,000 tons	1,900	7,955	8,320	4,900	17,000	6,930

NP = No projection. Production has been insignificant or nil.

by 1990, the record 1.5 million tons produced in 1976. Soybean production is not expected to undergo the major expansion in the eighties indicated as a plan goal by some CEMA countries. Yields are not expected to improve enough over the next few years to make expansion of soybean area attractive. In 1981, soybean yields averaged less than 1 ton per hectare for the countries covered in this study compared with 2.1 tons in neighboring Yugoslavia. Production is projected at 522,000 tons in 1985 and 585,000 tons in 1990.

Livestock Production

A slowdown in the expansion of livestock production in Eastern Europe is projected for the first half of the eighties. During the previous decade, livestock production grew much more rapidly than crop production, with the gap between the two largely covered by imported feeds. The deepening shortage of available hard currency will force a reduction of such imports for the region into the second half of the eighties.

Meat production in Eastern Europe in 1986 is projected at 10.6 million tons, 4.5 percent above the 1976-80 average of 10.15 million tons, but modestly below the 10.66 million tons produced in 1980 (table 19).³ Production of cow's milk is expected to be up by 4.8 percent in 1986 relative to the 1976-80

average. Virtually all increases will come from higher milk yields. Egg production is expected to expand more rapidly than milk production. Production in 1986 is projected at 34.1 billion eggs and would be higher if not for the feed problem in Poland.

During the second half of the eighties, livestock production is projected to expand more rapidly, but growth will remain below long-term average rates. By 1991, meat production is expected to reach 11.6 million tons.

A significant drop in meat production between 1980 and 1986 is projected for Poland (table 20). That country's need to curtail feed imports and its problems in expanding domestic feed supplies will keep production throughout the rest of the decade well below the peak of 3.26 million tons reached in 1979. A smaller reduction in meat production during the first half of the eighties is projected for Czechoslovakia, with partial recovery toward the 1981 record of 1.53 million tons by 1991 (table 21). The other countries are expected to show modest growth in meat production, except Romania where meat production is projected to increase 40 percent between 1980 and 1991. Pork production is expected to account for most of the increase in meat production. Because of a shortage of corn, Poland's poultry meat production will only partially recover from the recent decline. East European beef production is expected to show very little growth; cow numbers are not expected to expand. And, there will be growing pressure to limit planned expansion of beef cattle operations unless the heavy reliance on feed concentrates common in Eastern Europe can be reduced.

Food Consumption

Food consumption patterns will change little in Eastern Europe by 1990. For the most significant food item, meat, only Romania and Bulgaria are expected to increase per capita consumption in the eighties. Any growth in Hungary and the GDR will probably be quite small. Czechoslovakia now officially projects slightly lower per capita consumption in 1985 than it currently enjoys. In Poland, consumption levels of meat have declined to levels of the early seventies. Per capita consumption of meat in 1985 is expected to be about 55-56 kilograms compared with 74 kilograms in 1980 (26). Because of slow growth in domestic production and the need to boost meat exports, per capita consumption of meat in Poland may not exceed 60 kilograms again before 1990.

Table 19—Total East European livestock production, 1976–80 average, and projections for 1986 and 1991

Product	1976–80 average	1986	1991
	1,000 tons		
Meat, carcass weight	10,148	10,600	11,570
Pork	5,876	6,245	6,845
Beef	2,392	2,360	2,491
Poultry	1,510	1,620	1,826
Other meat	370	375	408
Cow's milk	38,689	40,530	42,255
	Millions		
Eggs	31,722	34,065	36,185

³ Projections of livestock production are lagged 1 year from crop output because livestock production in any given year is heavily influenced by the previous year's crop production. Thus, livestock projections for 1986 and 1991 relate to the crop projections for 1985 and 1990, respectively.

Table 20—Livestock product projections, by country, 1986

Product	Bulgaria	Czechoslovakia	GDR	Hungary	Poland	Romania
1,000 tons						
Meat, carcass weight	880	1,390	1,990	1,640	2,575	2,125
Pork	435	735	1,355	1,030	1,530	1,160
Beef	160	445	463	197	745	350
Poultry	170	170	152	393	210	525
Other meat	115	40	20	20	90	90
Cow's milk	2,090	6,200	8,100	3,090	16,800	4,250
Millions						
Eggs	2,745	5,400	5,900	4,270	8,000	7,750

Table 21—Livestock product projections, by country, 1991

Product	Bulgaria	Czechoslovakia	GDR	Hungary	Poland	Romania
1,000 tons						
Meat, carcass weight	975	1,440	2,050	1,690	2,900	2,515
Pork	475	750	1,390	1,070	1,770	1,390
Beef	175	470	484	197	800	365
Poultry	196	180	155	400	230	665
Other meat	129	40	21	23	100	95
Cow's milk	2,310	6,580	8,100	3,300	17,500	4,465
Millions						
Eggs	3,050	5,900	6,050	4,270	8,400	8,515

Per capita consumption of eggs and dairy products in most countries of Eastern Europe will continue to increase. Little change is anticipated in consumption of plant food items. Cereals and potatoes could decline marginally, whereas sugar and vegetables could increase slightly. Total consumption of vegetable oils is unlikely to change.

The prospects for consumption given here are based largely on projections of food supply. In the non-market economic environment of Eastern Europe, food supplies are primarily determined by government targets. However, planners must consider demand influences if growing food market disequilibrium is to be avoided. Prospects for economic recovery through the eighties indicate that disposable income will increase more slowly than in the past. The countries of the region should be able to avoid further disequilibrium in the food market over the next few years by increasing retail prices.

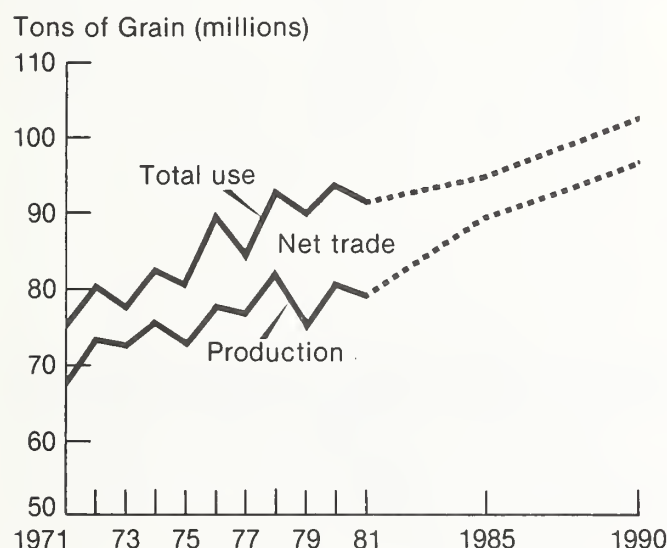
Agricultural Trade

The growing debt-service burden that most East European countries now experience is forcing them to improve their agricultural trade balances. Poland was obliged to significantly cut agricultural imports in 1982. Other countries, particularly Romania, are in a similar bind.

Imports. East European grain imports peaked in 1980 at over 17 million tons. Net imports totaled 13.5 million tons. Based on projections of livestock and grain production, net imports of grain in 1985/86 are expected to reach only 5.1 million tons. If East European grain exports remain at 3-4 million tons, total grain imports are expected to be 8-9 million tons in 1985/86, or about 50 percent below the amount in 1980 (fig. 4 and table 22). With a modest increase in livestock production growth rates in the second half of the decade, net imports of grain could expand slightly between 1985/86 and

Figure 4

Eastern Europe's Grain Production and Total Use, 1971-81, and Projections to 1985 and 1990



Source: (5) Statistical yearbooks of the respective countries.

1990/91. Based on the livestock and crop projections presented earlier in this report, net imports of grain in 1990/91 are projected at 5.7 million tons, 12 percent above the projection for 1985/86, but still well below the record (table 23).

The GDR is expected to become the largest net importer of grain in the region, with imports of 3.2 million tons in 1985/86. Poland, traditionally the largest grain importer in Eastern Europe, is expected

to force net imports of grain down to 2.4 million tons by 1985/86 compared with imports in excess of 7 million tons in the late seventies and first 2 years of the eighties. Such a reduction will be possible primarily because of a lack of growth in livestock feed demand from current levels. Wheat is expected to account for nearly all Polish grain imports in 1985/86. With an upturn in livestock production anticipated during the latter half of the eighties, Polish grain imports are projected to rebound to nearly 3.5 million tons by 1990-91. The GDR, however, is expected to gradually reduce grain imports to 2.8 million tons by 1990/91. Because these grain projections are tied to livestock projections, a lower level of actual grain imports would mean a correspondingly lower level of livestock production. Furthermore, these projections are based on the historical experience of the seventies, when all East European countries became increasingly dependent on feed concentrates. Assuming an improved utilization of nonconcentrate feeds in the eighties, which is an official policy of many countries of the region, livestock production would be higher, or grain and oilmeal imports lower, than projected.

Bulgaria is expected to be roughly self-sufficient in grain by 1985/86 in contrast to its recent net imports of up to 500,000 tons. In 1985/86, Bulgarian exports of wheat are expected to be slightly more than imports of corn. This pattern is projected to continue through 1990/91. Hungary is projected as the largest exporter of grain in the region in both 1985/86 and 1990/91. The size of its grain exports might be reduced if the decision is made to feed the grain domestically and export meat instead.

Projected imports of 4.8 million tons of oilseeds, oilseed meal, and fishmeal (soybean meal equivalent (SME)) in 1985/86 fall short of the 5.1 million tons

Table 22—Projected grain production, use, and net trade, 1985/86¹

Country	Production	Feed use	Other use	Total use	Net exports
1,000 tons					
Bulgaria	9,400	6,634	2,659	9,293	107
Czechoslovakia	10,905	7,941	3,960	11,901	-996
GDR	10,200	9,791	3,579	13,370	-3,170
Hungary	14,160	10,464	2,905	13,369	791
Poland	22,000	14,603	9,794	24,397	-2,397
Romania	22,600	14,532	7,525	22,057	543
Total	89,265	63,965	30,422	94,387	-5,122

¹ Production projected for 1985, trade for 1985/86 marketing year, and use for 1986.

Table 23—Projected grain production, use, and net trade, 1990/91¹

Country	Production	Feed use	Other use	Total use	Net exports
1,000 tons					
Bulgaria	10,170	7,491	2,666	10,157	13
Czechoslovakia	11,610	8,487	4,068	12,555	-945
GDR	10,860	10,060	3,629	13,689	-2,829
Hungary	14,920	10,972	2,956	13,928	992
Poland	23,930	17,154	10,228	27,382	-3,452
Romania	25,200	17,000	7,698	24,698	502
Total	96,690	71,164	31,245	102,409	-5,719

¹ Production projected for 1990, trade for 1990/91 marketing year, and use for 1991.

imported in 1980 (table 24). All countries in the region, except Poland, are projected to have a total SME use above the 1976-80 average. A sizeable decline is anticipated in Poland despite the continued shortage of protein in feed rations and some reports calling for higher supplies by 1985/86. Soybeans and soybean meal will probably account for most of the increase in imports for the other countries.

The small increase in domestic protein supplies will be insufficient to satisfy the demand generated by an upturn in livestock production during the second half of the eighties. This situation is projected to cause a 15-percent increase in oilmeal imports between 1985/86 and 1990/91 (table 25). Throughout the decade, the GDR is expected to be the largest importer of oilmeal, followed by Poland.

U.S. Trade Implications. The U.S. share of the East European grain market in 1985/86 and 1990/91 will depend on a variety of factors. Most important will be the supplies of grain for export in the EC and Canada, our major grain competitors in the region. In addition, credit availability will probably continue to be an important determinant of market share. The proportion of wheat to coarse grains in future East European grain imports will also influence market shares. The United States has traditionally commanded a larger share of the East European coarse grain market than of the wheat market and has been the primary supplier of corn.

Recent movements in market shares indicate that the United States is treated as a residual grain supplier by Eastern Europe. The 56-percent market share held by the United States in 1980 dropped to less than 30 percent by 1982. The United States may encounter problems recovering its previous market

Table 24—Projected supply and use of oilseeds and oilseed meal¹ (in soybean meal equivalent), 1985/86

Country	Domestic supply ²	Use	Imports
1,000 tons			
Bulgaria	270	608	338
Czechoslovakia	104	910	806
GDR	147	1,520	1,373
Hungary	258	988	730
Poland	328	1,143	815
Romania	529	1,271	742
Total	1,636	6,440	4,804

¹ Including fishmeal.

² Processed from domestic commodities.

Table 25—Projected supply and use of oilseeds and oilseed meal¹ (in soybean meal equivalent), 1990/91

Country	Domestic supply ²	Use	Imports
1,000 tons			
Bulgaria	303	701	398
Czechoslovakia	117	995	878
GDR	153	1,581	1,428
Hungary	295	1,049	754
Poland	356	1,462	1,106
Romania	553	1,517	964
Total	1,777	7,305	5,528

¹ Including fishmeal.

² Processed from domestic commodities.

share because the East European grain import projections are even lower than the 1982 figure. Also, coarse grains are expected to account for a smaller percentage of total East European grain imports through 1990/91 than they did during the latter half of the seventies and the first 2 years of the eighties.

Most of the decline in the U.S. share of the East European grain import market between 1980 and 1982 has been picked up by the EC and, to a lesser extent, by Canada. Both the EC and Canada have relied on credit financing to maintain their grain exports to Eastern Europe.

Without expanded credit availability from the United States and given the lack of recovery projected in total East European grain imports, a U.S. market share above one-third may prove difficult to achieve. This projection implies that U.S. grain exports to the region will not greatly exceed 3 million tons per year through the eighties. Assuming, under a favorable scenario, a recovery of the U.S. market share to one-half, U.S. grain exports would be roughly 4.5-5.0 million tons. This range is still well below the peak export levels of 1979-81 of 7.0-10.5 million tons.

A similar drop occurred between 1980 and 1982 in the U.S. market share of East European oilmeal imports. Oilmeal exports from the United States to Eastern Europe fell from 1.5 million tons in 1980 to just 430,000 tons in 1982. This represents a decline in the U.S. market share from 36 percent to less than 15 percent.

Several reasons, however, suggest a recovery in the U.S. market share for East European oilmeal imports. First, projections indicate a recovery of total oilmeal imports in the next few years, with record-high imports by the end of the eighties. Second, Brazil is no longer able to extend credit and may have trouble expanding its bilateral trade arrangements. A recovery of the U.S. market share to 30 percent appears reasonable. The U.S. share of East European imports of all oilmeal, oilseeds, and fish meal, converted to soybean meal equivalent, will likely be somewhat higher, because the United States accounts for nearly all soybean exports to Eastern Europe. Assuming a market share of 35 percent, U.S. exports of oilmeal and oilseeds to Eastern Europe, in soybean meal equivalent, would be nearly 1.7 million tons in 1985/86 and reach 1.9 million tons by 1990/91.

Exports. Higher agricultural exports could further improve the East European trade balance. Romania plans to increase agricultural exports 54 percent in 1981-85. The East European countries will rely on exports of poultry, fruits and vegetables, and processed products to generate hard currency.

Prospects for larger exports of quality meats and live animals, except sheep, are dim. Slower growth in demand in Middle Eastern countries and developed Western markets is likely. Prices of energy and raw materials from the USSR will probably increase, making the USSR more able and willing to import larger amounts of agricultural products from Eastern Europe.

References

- (1) "ADN" (GDR News Agency). German Democratic Republic, June 6, 1979.
- (2) Council for Mutual Economic Assistance (CEMA) Secretariat. *Statisticheskii ezegodnik stran-chlenov Soveta Ekonomicheskoy Vzaimopomoshchi*. Moscow, various editions.
- (3) Directia Centrala de Statistica. *Anuarul Statistic al Republicii Socialiste Romania*. Bucharest, various editions.
- (4) Economic Commission for Europe, United Nations. *Agricultural Market Review*, No. 24. New York, 1982.
- (5) Food and Agricultural Organization of the United Nations. *FAO Trade Yearbook*. Rome, various editions.
- (6) Główny Urząd Statystyczny. *Rocznik Statystyczny*. Warsaw, various editions.
- (7) ———. *Rocznik Statystyczny Handlu Zagranicznego*. Warsaw, various editions.
- (8) "Internationale Zeitschrift der Landwirtschaft." East Berlin, 1976.
- (9) Komitet po Edinna Systema za Sotsialna Informatsiya pri Ministerskiya Suvet. *Statisticheski Godishnik na Narodna Republika Bulgaria*. Sofia, various editions.
- (10) Kozponti Statisztikai Hivatal. *Kulkereskedelmi Statisztikai Evkonyv*. Budapest, various editions.
- (11) ———. *Statisztikai Evkonyv*. Budapest, various editions.
- (12) Kraft, Ryszard. "Melioracje uzytkow rolnych w latach siedemdziesiatych," *Wies wspolczesna*, No. 10. Warsaw, 1980.
- (13) "Lumea." Bucharest, Oct. 30, 1981.
- (14) Makowiecki, Marcin. "Co bedziemy jedli Panie Ministrze?" *Zycie gospodarcze*, No. 45. Warsaw, Nov. 8, 1980.
- (15) Michna, Waldemar. "Program rolny i polityka agrarna lat osiemdziesiatych," *Wies wspolczesna*, No. 7. Warsaw, 1982.
- (16) Ninov, Goran. "Organizatsiya na avtotransporta v selskoto stopanstvo," *Ikonomika na selskoto stopanstvo*, No. 5. Sofia, 1979.
- (17) Organization for Economic Cooperation and Development (OECD). *Prospects for Agricultural Production and Trade in Eastern Europe*, Vol. I and II. Paris, 1982.
- (18) "Revista Economica." Bucharest, Dec. 29, 1978.
- (19) "Scinteia." Bucharest, Nov. 29, 1981.
- (20) Staatsverlag der Deutschen Demokratischen Republik. *Statistisches Jahrbuch der Deutschen Demokratischen Republik*. East Berlin, various editions.
- (21) Statistical Office of the European Community. *Eurostat Review, 1971-80*. Brussels, 1982.
- (22) Statisticky Urad, Ceskoslovenske Socialisticke Republiky, SNTL. *Statisticka Rocenka Ceskoslovenske Socialisticke Republiky*. Prague, various editions.
- (23) "Trybuna Ludu." Warsaw, May 21, 1982.
- (24) *Ibid.* June 2, 1982.
- (25) *Ibid.* March 15, 1983.
- (26) *Ibid.* June 14, 1983.
- (27) United Nations. *Statistical Yearbook*. New York, various editions.
- (28) U.S. Department of Agriculture, Economic Research Service. *Eastern Europe: Review of Agriculture in 1981 and Outlook for 1982*, Supplement 3 to WAS-27. Washington, D.C., June 1982.
- (29) ———. *The Feed-Livestock Economy of Eastern Europe—Prospects to 1980*. FAER-90. Washington, D.C., Oct. 1973.
- (30) "Zemedelske Noviny." Prague, April 5, 1979.

Appendixes

Projection Methodology

To project net trade in grain and oilmeal for Eastern Europe in 1985/86 and 1990/91, the authors first projected East European output for the following crops and livestock products: grain, oilseeds (converted to soybean meal equivalent), potatoes, meat (beef and veal, pork, poultry and other meals), eggs, and milk. Crop projections are for 1985 and 1990, and livestock projections are for 1986 and 1991 because crop output in any one year influences livestock production most in the succeeding year.

Next, the authors calculated grain consumption based on the five major uses of grain: food, waste, industrial, seed, and feed, and they also calculated oilmeal consumption. Projections for the first four uses of grain are based on historical trends and population projections. Grain for feed use and oilmeal consumption were derived from projected livestock production based on the historical relationship of those feeds to livestock production. The authors then subtracted total grain and oilmeal consumption from the respective production projections to arrive at net trade.

Crop Production. The authors analyzed short-term (1979-81) and long-term (1969-79) yield and area trends of grains, oilseeds, and potatoes by individual countries in developing area and yield projections. Subjective considerations of future growth potential based on investment plans, official statements, and technological progress also influenced final projections. Weather was assumed to be "normal."

Projected total grain output is the sum of projected area times yield for individual grains in each country. The authors used a similar procedure for oilseeds and potatoes. Oilseeds (soybean, rapeseed, and sunflowerseed) were converted to soybean meal equivalent to obtain a common denominator. The principal protein meal fed in Eastern Europe is soybean meal.

Livestock Production. The authors ran separate production trends for individual meats, milk, and eggs based on 1969-79 trends. Milk and eggs were converted to meat equivalent. In many cases,

however, the trend results were modified because of recent performance, official plans, and expectations of continued limited finances for feed imports.

Domestic Grain and Oilmeal Consumption. The authors projected the five grain consumption categories to arrive at total grain consumption as follows: (1) food use resulted from projected per capita consumption figures times projected population; (2) industrial use was based on recent trends; (3) seed use was based on projected grain area times standard seeding rates by country; (4) waste was set at 5 percent of domestic production: 7 percent in Romania where production data do not adequately discount moisture content; (5) feed use was projected by first running regressions over 1969-79 of annual livestock production (in meat equivalent) on annual grain for feed use. The authors utilized ERS grain data bases for the historical grain-for-feed data. Next, the authors plugged projected livestock production in 1986 and 1991 into the regression equations to calculate respective grain requirements for feed. In the regression and projections for the GDR, Poland, and Czechoslovakia, potatoes used for feed (taken from ERS potato balances) were converted to grain equivalent and added to grain for feed totals.

The authors projected oilmeal consumption by first running regressions over 1969-79 of livestock production (in meat equivalent) on total oilmeal consumption. Oilmeal data were taken from ERS data bases. These data bases sum domestic production and net imports of major oilseeds and fishmeal with imports of oilmeal; all are expressed in soybean meal equivalent. Next, the authors plugged projected livestock production in 1986 and 1991 into the regression equations to calculate respective oilmeal requirements. They assumed that the share of nonconcentrated feeds in total feed supplies will remain at the level of the seventies in both 1985/86 and 1990/91.

Net Trade Projections. The sum of projected feed and nonfeed consumption of grain less projected grain production equals net grain trade. Total consumption less domestic production of soybean meal equivalent equals net soybean meal-equivalent trade. The trade projection is for the marketing year of each commodity.

Conversion Factors

The authors used the following conversion factors in the projection methodology:

1 kg. of potatoes = 0.25 kg. of grain

1 kg. of meat = 1 kg. of eggs = 6.7 liters of milk

Conversion Factors to Soybean Meal Equivalent

Soybean meal	1.0000
Sunflowerseed meal	.9442
Rapeseed meal	.7115
Peanut meal	1.1240
Fish meal	1.4452
Cottonseed meal	.8103
Linseed meal	.7609

Seeding rates for grains

Grain	Bulgaria	Czechoslovakia	GDR	Hungary	Poland	Romania
	<i>Kilograms/hectare</i>					
Wheat	195	190	190	180	190	200
Barley	175	150	150	175	175	175
Oats	175	150	150	160	185	180
Rye	175	150	150	180	185	180
Corn	50	35	45	35	35	40

Source: (29).

Appendix Tables

Appendix table 1—Per capita consumption of meat, meat products, and eggs

Commodity and year	Bulgaria	Czechoslovakia	GDR	Hungary	Poland	Romania
Kilograms						
Total meat and meat products:						
1971	43.6	73.7	68.5	59.5	56.1	NA
1975	58.0	81.1	77.8	68.4	70.3	45.7
1980	61.2	85.6	89.4	71.7	74.0	60.0
Pork—						
1971	NA	36.1	41.5	31.6	(32.0)	NA
1975	27.8	40.0	48.0	41.4	40.9	NA
1980	(27.5)	(43.3)	57.6	40.2	37.2	(27.6)
Beef and veal—						
1971	NA	24.3	(19.9)	9.6	13.0	NA
1975	11.2	27.3	(20.8)	7.4	15.5	NA
1980	(9.8)	(27.1)	(21.4)	9.6	18.5	(12.1)
Poultry—						
1971	NA	8.8	5.7	14.7	(3.5)	NA
1975	11.1	10.0	7.6	15.3	6.3	NA
1980	(15.4)	(12.1)	9.0	18.0	11.2	(16.2)
Other meats— ¹						
1971	NA	4.5	(1.4)	3.6	(7.6)	NA
1975	7.9	3.8	(1.4)	4.3	7.6	NA
1980	(8.5)	(3.1)	(1.4)	3.9	7.1	(4.1)
Number						
Eggs:						
1971	127	284	246	238	193	NA
1975	146	297	269	274	209	214
1980	204	312	290	317	222	270

NA = Not available. () = Estimate.

¹ Includes horse, rabbit, mutton, and game meat; for Poland and Hungary, includes all edible offals.

Sources: (4, 29), and statistical yearbooks of the respective countries.

Appendix table 2—Per capita consumption of selected foods

Country and year	Vegetable oils	Sugar	Grain ¹	Potatoes	Vegetables	Fruit
Kilograms						
Bulgaria:						
1971	13.0	33.0	179.0	28.9	118.0	139.9
1975	14.1	32.5	162.0	23.1	127.0	118.6
1980	15.1	34.7	160.0	26.1	126.0	105.8
Czechoslovakia:						
1971	6.0	37.5	113.0	109.0	70.0	35.9
1975	6.7	38.0	108.0	96.0	74.0	47.7
1980	7.0	37.5	107.0	76.1	65.6	55.6
GDR:						
1971	2.2	34.4	97.1	150.6	84.2	57.6
1975	2.0	36.8	94.8	142.0	90.0	66.6
1980	1.7	40.7	94.2	142.1	96.8	63.4
Hungary:						
1971	1.9	34.5	124.0	72.1	82.5	71.9
1975	2.9	39.4	118.0	66.8	85.2	74.0
1980	4.0	35.0	111.0	62.0	79.6	74.9
Poland:						
1971	5.8	39.6	128.0	189.0	85.8	20.3
1975	6.5	43.2	120.0	173.0	109.0	34.4
1980	6.8	41.4	124.0	163.0	100.0	37.0
Romania:						
1971	NA	NA	NA	NA	NA	NA
1975	NA	20.3	172.0	71.0	140.0	NA
1980	NA	28.2	180.0	NA	NA	NA

NA = Not available.

¹ In flour equivalent.

Sources: (13, 18, 19), and statistical yearbooks of the respective countries.

Appendix table 3—Expenditures on food and beverages as a percentage of household total disposable income

Country and type of employment	1971	1975	1980	Country and type of employment	1971	1975	1980
Percent				Percent			
Bulgaria: ¹				Hungary: ²			
Industrial workers	47	43	48	Industrial workers	NA	41	43
Professionals	42	39	45	Professionals	NA	33	35
Collective farmers	49	45	52	Collective farmers	NA	43	46
Czechoslovakia:				Poland:			
Industrial workers	32	30	27	Industrial workers and professionals, total	45	40	39
Professionals	29	27	24	Peasants	NA	49	43
Collective farmers	28	28	26	Romania:			
GDR: ²				Nonagricultural workers	NA	NA	46
Industrial workers and professionals, total	36	37	36	Collective farmers	NA	NA	63
Collective farmers	39	37	37				

NA = Not available.

¹ Includes tobacco for 1971.² Includes tobacco.

Sources: Statistical yearbooks of the respective countries.

Appendix table 4—Land utilization, 1976–80 average

Item	Bulgaria	Czecho- slovakia	GDR	Hungary	Poland	Romania	Total
<i>Million hectares</i>							
Total land	11.1	12.8	10.8	9.3	31.3	23.7	99.0
Agricultural land	6.2	6.9	6.3	6.7	19.1	15.0	60.2
Arable land	4.3	5.2	5.0	5.4	15.0	10.5	45.4
Grains	2.2	2.7	2.5	2.9	7.9	6.4	24.6
Oilseeds	.3	.1	.1	.3	.3	.8	1.9
Sugar beets	.1	.2	.3	.1	.5	.2	1.4
Potatoes	INS	.2	.6	.1	2.4	.3	3.6
Garden, orchard and vineyard	.4	.4	.3	.5	.3	.7	2.6
Other crops	1.3	1.6	1.2	1.5	3.6	2.1	11.3
Meadow	.3	.9	1.3	.4	2.5	1.4	6.8
Pasture	1.5	.8	¹	.9	1.5	3.0	7.7
Forest	3.8	4.5	3.0	1.6	8.7	6.3	27.9
Other area	1.1	1.4	1.6	1.0	3.5	2.5	11.1
<i>Percent</i>							
Total land	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agricultural land	55.9	53.9	58.3	72.0	61.0	63.3	60.8
Arable land	38.7	40.6	46.3	58.1	47.9	44.3	45.9
Meadow	2.7	7.0	12.0	4.3	8.0	5.9	6.9
Pasture	13.5	6.2	¹	9.7	4.8	12.7	7.8
<i>Percent of arable land</i>							
Grains	51.2	51.9	50.0	53.7	52.7	61.0	54.2
Oilseeds	7.0	1.9	2.0	5.6	2.0	7.6	4.2
Sugar beets	2.3	3.8	6.0	1.8	3.3	1.9	3.1
Potatoes	INS	3.8	12.0	1.8	16.0	2.9	7.9
Garden, orchard, and vineyard	9.3	7.7	6.0	9.3	2.0	6.7	5.7
Other crops	30.2	30.8	24.0	27.8	24.0	19.9	24.9

INS = Insignificant.

¹ Included in meadow.

Sources: Statistical yearbooks of the respective countries.

Appendix table 5—Grain area

Commodity and period averages	Bulgaria	Czechoslovakia	GDR	Hungary	Poland	Romania	Total
1,000 hectares							
Wheat:							
1961-65	1,216	739	430	1,077	1,516	2,966	7,944
1966-70	1,064	991	549	1,231	1,835	2,769	8,439
1971-75	945	1,199	687	1,292	1,987	2,423	8,533
1976-80	938	1,229	720	1,274	1,735	2,256	8,153
Rye:							
1961-65	58	429	820	240	4,563	88	6,199
1966-70	29	310	724	189	4,087	57	5,395
1971-75	17	220	638	113	3,320	41	4,348
1976-80	15	186	645	81	2,997	40	3,965
Corn:							
1961-65	632	200	1	1,269	8	3,308	5,417
1966-70	582	139	2	1,235	5	3,246	5,209
1971-75	630	157	3	1,410	7	3,110	5,317
1976-80	656	201	1	1,297	41	3,295	5,491
Barley:							
1961-65	336	687	438	516	704	237	2,919
1966-70	404	739	590	398	727	278	3,136
1971-75	478	885	735	281	1,113	363	3,854
1976-80	485	919	981	237	1,288	662	4,572
Oats:							
1961-65	139	418	319	82	1,549	151	2,657
1966-70	95	402	254	52	1,409	132	2,344
1971-75	57	278	236	42	1,287	102	2,001
1976-80	49	162	157	35	1,067	52	1,522
Total grains: ¹							
1961-65	2,397	2,473	2,262	3,204	8,612	6,851	25,799
1966-70	2,200	2,581	2,312	3,127	8,378	6,534	25,132
1971-75	2,143	2,739	2,397	3,168	8,217	6,069	24,734
1976-80	2,159	2,698	2,524	2,949	7,868	6,353	24,552

¹ Includes wheat, rye, corn, barley, oats, buckwheat, millet, spelt, mixed grains, sorghum, and rice.

Sources: Statistical yearbooks of the respective countries.

Appendix table 6—Changes in grain area

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Eastern Europe
1,000 tons							
Percent ¹							
Wheat:							
1966–70/1961–65	–12.5	34.2	27.7	14.3	21.1	–6.6	6.2
1971–75/1966–70	11.2	20.9	25.1	4.9	8.3	–12.5	1.1
1976–80/1971–75	–.7	2.6	4.8	–1.4	–12.7	–6.9	–4.5
Rye:							
1966–70/1961–65	–50.9	–27.9	–11.7	–21.2	–10.4	–35.5	–13.0
1971–75/1966–70	–41.3	–28.9	–11.9	–40.5	–18.8	–28.2	–19.4
1976–80/1971–75	–10.7	–15.5	1.2	–28.2	–9.7	–2.0	–8.8
Corn:							
1966–70/1961–65	–7.9	–30.4	—	–2.6	–35.7	–1.9	–3.8
1971–75/1966–70	8.2	122.8	—	14.1	33.3	–4.2	2.1
1976–80/1971–75	4.1	28.4	—	–8.0	472.2	5.9	3.3
Barley:							
1966–70/1961–65	20.2	7.6	34.7	–22.9	3.2	17.2	7.4
1971–75/1966–70	18.3	19.7	24.5	–29.4	53.1	30.6	22.9
1976–80/1971–75	1.4	3.8	33.5	–15.6	15.7	82.2	18.6
Oats:							
1966–70/1961–65	–31.4	–3.9	–20.3	–36.4	–9.0	–12.5	–11.8
1971–75/1966–70	–40.5	–30.7	–7.0	–20.6	–8.7	–22.8	–14.6
1976–80/1971–75	–13.1	–41.7	–33.3	–14.9	–17.1	–49.3	–23.9
Total grains: ²							
1966–70/1961–65	–8.2	4.4	2.2	–2.4	–2.7	–4.6	–2.6
1971–75/1966–70	–2.6	6.1	3.7	1.3	–1.9	–7.1	–1.6
1976–80/1971–75	.8	–1.5	5.3	–6.9	–4.2	4.7	–.7

— = Not computed.

¹ Rates of change based on 5-year averages.

² Includes wheat, rye, corn, barley, oats, buckwheat, millet, spelt, mixed grains, sorghum, and rice.

Appendix table 7—Grain production

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
1,000 tons							
Wheat:							
1961–65	2,208	1,779	1,357	2,009	2,988	4,321	14,662
1966–70	2,919	2,869	2,006	2,997	4,260	4,688	19,739
1971–75	3,182	4,360	2,797	4,299	5,605	5,395	25,639
1976–80	3,509	4,949	2,998	5,181	5,089	6,106	27,831
Rye:							
1961–65	58	896	1,741	260	7,466	95	10,516
1966–70	35	678	1,718	224	7,469	62	10,186
1971–75	21	629	1,774	165	7,679	56	10,323
1976–80	21	578	1,748	133	6,475	49	9,004
Corn:							
1961–65	1,601	474	3	3,316	20	5,853	11,266
1966–70	2,147	472	4	4,004	13	7,239	13,879
1971–75	2,505	640	11	5,934	27	8,349	17,466
1976–80	2,652	724	3	6,347	165	11,097	20,987
Barley:							
1961–65	694	1,556	1,291	965	1,368	414	6,288
1966–70	986	2,087	1,913	843	1,673	532	8,035
1971–75	1,477	2,991	2,966	813	3,181	845	12,272
1976–80	1,532	3,386	3,715	769	3,560	1,981	14,944

See footnote at end of table.

—Continued

Appendix table 7—Grain production—Continued

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
1,000 tons							
Oats:							
1961-65	141	792	850	96	2,641	154	4,673
1966-70	121	866	762	73	2,893	140	4,855
1971-75	70	729	841	81	3,158	104	4,983
1976-80	70	423	525	85	2,434	56	3,593
Total grains: ¹							
1961-65	4,728	5,498	5,847	6,682	15,000	10,887	48,641
1966-70	6,246	6,972	6,673	8,179	16,968	12,727	57,765
1971-75	7,326	9,349	8,678	11,364	20,939	14,814	72,470
1976-80	7,849	10,059	9,038	12,551	19,495	19,383	78,375

¹ Includes wheat, rye, corn, barley, oats, buckwheat, millet, spelt, mixed grains, sorghum, and rice.

Source: Statistical yearbooks of the respective countries.

Appendix table 8—Changes in grain production

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Eastern Europe
Percent ¹							
Wheat:							
1966-70/1961-65	32.2	61.3	47.9	49.1	42.6	8.5	34.6
1971-75/1966-70	9.0	52.0	39.4	43.5	31.6	15.1	29.9
1976-80/1971-75	10.3	13.5	97.2	20.5	-9.2	13.2	8.6
Rye:							
1966-70/1961-65	-39.9	-24.4	-1.3	-13.6	0	-34.8	-3.1
1971-75/1966-70	-41.1	-7.2	3.2	-26.3	2.8	-10.0	1.3
1976-80/1971-75	0	-8.1	-1.4	-19.3	-15.7	-11.2	-12.8
Corn:							
1966-70/1961-65	34.1	-4	—	20.7	-35.7	23.7	23.2
1971-75/1966-70	16.7	35.8	—	48.2	112.7	15.3	25.8
1976-80/1971-75	5.9	13.0	—	7.0	514.2	32.9	20.2
Barley:							
1966-70/1961-65	42.1	34.1	48.2	12.7	22.3	28.5	27.8
1971-75/1966-70	49.8	43.3	55.0	-3.5	90.1	58.8	52.7
1976-80/1971-75	3.8	13.2	25.3	-5.4	11.9	134.4	21.8
Oats:							
1966-70/1961-65	-14.6	9.3	-10.3	-23.2	9.6	-8.8	3.9
1971-75/1966-70	1.8	-15.8	10.3	10.1	9.2	-25.5	2.6
1976-80/1971-75	-.6	-41.9	-37.5	5.4	-22.9	-46.4	-27.9
Total grains: ²							
1966-70/1961-65	32.1	26.8	14.1	22.4	13.1	16.9	18.8
1971-75/1966-70	17.3	33.8	30.1	38.9	23.4	16.4	25.4
1976-80/1971-75	7.1	7.9	4.1	10.4	-6.9	30.8	8.2

— = Not computed.

¹ Rates of change based on 5-year averages.

² Includes wheat, rye, corn, barley, oats, buckwheat, millet, spelt, mixed grains, sorghum, and rice.

Appendix table 9—Area of selected crops

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
1,000 hectares							
Corn silage:							
1961-65	NA	NA	NA	NA	NA	NA	NA
1966-70	204	272	300	265	124	208	1,372
1971-75	269	389	337	250	299	291	1,836
1976-80	273	439	372	319	624	172	2,200
Hay:							
1961-65	NA	NA	NA	NA	NA	NA	NA
1966-70	436	1,252	581	654	1,707	1,096	5,726
1971-75	418	1,073	512	675	1,648	1,187	5,512
1976-80	453	957	540	656	1,698	942	5,246
Potatoes:							
1961-65	41	492	728	220	2,833	303	4,616
1966-70	32	376	665	159	2,729	306	4,265
1971-75	29	298	633	112	2,654	291	4,017
1976-80	35	223	565	85	2,410	292	3,610
Sugar beets:							
1961-65	71	247	227	125	428	177	1,275
1966-70	59	193	202	98	420	183	1,154
1971-75	60	198	232	94	448	215	1,247
1976-80	66	217	260	118	505	247	1,413
Soybeans:							
1961-65	0	0	0	0	0	8	8
1966-70	0	0	0	0	0	50	50
1971-75	22	2	0	8	0	160	192
1976-80	83	3	0	25	0	239	351
Rapeseed:							
1961-65	8	45	113	6	224	2	397
1966-70	0	44	111	14	279	0	448
1971-75	0	54	118	45	304	5	526
1976-80	0	72	122	55	327	6	583
Sunflowerseed:							
1961-65	252	0	0	115	0	452	820
1966-70	273	0	0	86	0	521	881
1971-75	259	4	0	114	0	527	903
1976-80	231	13	0	185	0	514	944

NA = Not available.

Sources: (2), and statistical yearbooks of the respective countries.

Appendix table 10—Changes in area of selected crops

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Eastern Europe
Percent ¹							
Corn silage:							
1966-70/1961-65	NA	NA	NA	NA	NA	NA	NA
1971-75/1966-70	32.0	43.0	12.5	-5.4	141.3	40.4	33.8
1976-80/1971-75	1.7	12.9	10.4	27.6	108.6	-41.0	19.8
Hay:							
1966-70/1961-65	NA	NA	NA	NA	NA	NA	NA
1971-75/1966-70	-4.2	-14.3	-12.0	3.1	-3.5	8.3	-3.7
1976-80/1971-75	8.4	-10.9	5.6	-2.8	3.1	-20.6	-4.8
Potatoes:							
1966-70/1961-65	-22.9	-23.6	-8.7	-27.7	-3.7	.9	-7.6
1971-75/1966-70	-7.0	-20.7	-4.8	-29.3	-2.7	-4.8	-5.8
1976-80/1971-75	18.4	-25.2	-10.6	-24.1	-9.2	.5	-10.1
Sugar beets:							
1966-70/1961-65	-17.5	-21.8	-11.0	-22.0	-2.0	3.2	-9.5
1971-75/1966-70	1.7	2.7	15.3	-4.1	6.7	17.6	8.1
1976-80/1971-75	10.4	9.5	12.0	25.8	12.7	15.1	13.3
Soybeans:							
1966-70/1961-65	—	—	—	—	—	—	—
1971-75/1966-70	—	—	—	—	—	—	—
1976-80/1971-75	270.5	70.0	—	217.5	—	49.6	82.6
Rapeseed:							
1966-70/1961-65	—	-3.1	-1.8	140.0	24.8	—	12.8
1971-75/1966-70	—	23.3	6.7	209.7	9.0	—	17.4
1976-80/1971-75	—	33.7	3.4	23.3	7.6	19.2	10.8
Sunflowerseed:							
1966-70/1961-65	8.3	—	—	-25.0	—	15.3	7.5
1971-75/1966-70	-5.4	—	—	32.5	—	1.1	2.5
1976-80/1971-75	-10.8	272.2	—	62.0	—	-2.4	4.5

NA = Not available.

— = Not computed.

¹ Rates of change based on 5-year averages.

Appendix table 11—Production of selected crops

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
1,000 tons							
Corn silage:							
1961-65	NA	NA	NA	NA	NA	1,480	NA
1966-70	3,340	7,183	10,478	5,222	4,408	3,383	34,014
1971-75	4,072	11,556	10,901	4,864	11,914	5,187	48,493
1976-80	4,866	14,930	10,951	6,104	21,512	4,348	62,711
Hay:							
1961-65	NA	NA	NA	NA	NA	NA	NA
1966-70	1,625	6,238	3,833	2,512	8,125	4,283	26,617
1971-75	1,691	6,151	3,841	2,804	8,799	5,409	28,694
1976-80	2,052	6,129	4,809	2,901	8,294	5,635	29,821
Potatoes:							
1961-65	401	5,635	12,066	1,735	44,309	2,600	66,745
1966-70	380	5,676	12,283	1,659	47,906	2,877	70,781
1971-75	355	4,571	10,806	1,320	47,082	3,387	67,521
1976-80	373	3,678	9,873	1,194	42,746	4,404	62,267
Sugar beets:							
1961-65	1,440	6,772	5,522	3,090	11,436	2,866	31,125
1966-70	1,862	7,195	6,310	3,175	13,601	3,768	35,910
1971-75	1,711	6,966	6,481	3,096	13,848	4,758	36,860
1976-80	1,834	7,132	6,996	3,975	14,150	6,134	40,221

See footnotes at end of table.

—Continued

Appendix table 11—Production of selected crops—Continued

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
1,000 tons							
Soybeans:							
1961-65	1	0	0	0	0	3	4
1966-70	4	0	0	0	0	48	51
1971-75	34	3	0	11	0	221	269
1976-80	114	4	0	35	0	293	447
Rapeseed:							
1961-65	5	59	171	7	323	7	572
1966-70	0	69	219	19	516	64	888
1971-75	0	110	268	60	557	7	1,002
1976-80	0	151	291	80	635	12	1,169
Sunflowerseed:							
1961-65	338	0	0	110	0	504	952
1966-70	462	3	0	96	0	728	1,289
1971-75	440	5	0	141	0	761	1,347
1976-80	391	18	0	298	0	825	1,532
Vegetables:							
1961-65	NA	NA	NA	NA	NA	NA	NA
1966-70	1,541	1,183	1,094	1,564	3,780	2,088	11,250
1971-75	1,577	1,078	1,141	1,631	3,764	2,675	11,866
1976-80	1,740	1,015	1,555	1,794	4,123	3,523	13,750
Fruits:							
1961-65	NA	NA	NA	NA	NA	NA	NA
1966-70	1,278	552	670	1,243	1,238	1,315	6,296
1971-75	1,073	351	570	1,379	1,150	1,096	5,619
1976-80	936	439	686	1,510	1,717	1,469	6,757

NA = Not available.

Sources: (2), and statistical yearbooks of the respective countries.

Appendix table 12—Changes in production of selected crops

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Eastern Europe
Percent ¹							
Corn silage:							
1966-70/1961-65	NA	NA	NA	NA	NA	NA	NA
1971-75/1966-70	21.9	60.9	4.0	-6.9	170.3	53.4	42.6
1976-80/1971-75	19.5	29.2	.5	25.5	80.6	-16.2	29.3
Hay:							
1966-70/1961-65	NA	NA	NA	NA	NA	NA	NA
1971-75/1966-70	4.0	-1.4	.2	11.6	8.3	26.3	7.8
1976-80/1971-75	21.4	-.4	25.2	3.5	-5.7	4.2	3.9
Potatoes:							
1966-70/1961-65	-5.0	.7	1.8	-4.4	8.1	10.6	6.0
1971-75/1966-70	-6.6	-19.5	-12.0	-20.5	-1.7	17.7	-4.6
1976-80/1971-75	4.9	-19.5	-8.6	-9.4	-9.2	30.0	-7.8
Sugar beets:							
1966-70/1961-65	29.3	6.3	14.3	2.8	18.9	31.4	15.4
1971-75/1966-70	-8.1	-3.2	2.7	-2.5	1.8	26.3	2.6
1976-80/1971-75	7.2	2.4	7.9	28.4	2.2	28.9	9.1
Soybeans:							
1966-70/1961-65	—	—	—	—	—	—	—
1971-75/1966-70	—	—	—	—	—	364.7	—
1976-80/1971-75	234.5	69.2	—	220.0	—	32.5	66.2
Rapeseed:							
1966-70/1961-65	—	18.4	27.8	177.1	59.7	844.1	55.2
1971-75/1966-70	—	58.5	22.3	210.3	7.9	-89.7	12.8
1976-80/1971-75	—	37.6	8.7	33.2	14.0	75.8	16.7

See footnotes at end of table.

—Continued

Appendix table 12—Changes in production of selected crops—Continued

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Eastern Europe
Percent							
Sunflowerseed:							
1966-70/1961-65	37.0	550.0	—	-12.9	—	44.4	35.4
1971-75/1966-70	-4.9	100.0	—	47.3	—	4.6	4.6
1976-80/1971-75	-11.0	238.5	—	110.9	—	8.4	13.7
Vegetables:							
1966-70/1961-65	NA	NA	NA	NA	NA	NA	NA
1971-75/1966-70	2.3	-8.8	4.3	4.3	-4	28.1	5.5
1976-80/1971-75	10.4	-5.9	36.3	10.0	9.5	31.7	15.9
Fruits:							
1966-70/1961-65	NA	NA	NA	NA	NA	NA	NA
1971-75/1966-70	-16.1	-36.4	-14.8	10.9	-7.1	-16.6	-10.7
1976-80/1971-75	-12.7	25.1	20.3	9.5	49.3	34.0	20.3

NA = Not available.

— = Not computed.

¹ Rates of change based on 5-year averages.

Appendix table 13—Livestock numbers

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
Thousands							
Cattle:							
1961-65	1,517	4,466	4,605	1,943	9,655	4,639	26,825
1966-70	1,350	4,352	4,996	1,976	10,562	5,127	28,363
1971-75	1,421	4,445	5,386	1,927	11,434	5,678	30,291
1976-80	1,733	4,754	5,544	1,926	12,340	6,361	32,658
Cows:							
1961-65	578	2,019	2,134	846	5,811	2,054	13,443
1966-70	580	1,923	2,177	767	5,910	2,157	13,514
1971-75	615	1,908	2,165	772	6,075	2,429	13,963
1976-80	697	1,902	2,145	773	5,914	2,612	14,043
Hogs:							
1961-65	2,331	5,948	8,654	6,551	13,463	4,835	41,782
1966-70	2,221	5,325	9,181	6,173	14,577	5,668	43,145
1971-75	2,725	6,109	10,481	7,613	18,598	8,088	53,615
1976-80	3,669	7,240	11,683	7,805	20,219	9,995	60,612
Sheep:							
1961-65	10,070	574	1,922	2,350	2,655	12,217	29,787
1966-70	9,818	787	1,840	2,325	2,703	13,952	31,426
1971-75	9,856	891	1,690	2,041	2,639	14,115	31,233
1976-80	10,105	837	1,925	2,560	3,452	14,818	33,695
Poultry:							
1961-65	22,188	28,719	37,241	NA	77,231	39,022	NA
1966-70	25,334	32,031	38,880	47,460	82,240	46,542	272,488
1971-75	34,925	39,461	44,646	56,700	92,020	62,855	330,607
1976-80	39,989	44,871	49,102	63,002	86,259	90,858	374,080

NA = Not available.

Sources: Statistical yearbooks of the respective countries.

Appendix table 14—Changes in livestock numbers

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Eastern Europe
Percent ¹							
Cattle:							
1966-70/1961-65	- 11.0	- 2.5	8.5	1.7	9.4	10.5	5.7
1971-75/1966-70	5.3	2.1	7.8	- 2.5	8.3	10.7	6.8
1976-80/1971-75	21.9	6.9	2.9	0	7.9	12.0	7.8
Cows:							
1966-70/1961-65	.3	- 4.8	2.0	- 9.4	1.7	5.0	.5
1971-75/1966-70	6.1	-.8	-.6	.6	2.8	12.6	3.3
1976-80/1971-75	13.3	-.3	- 1.0	.2	- 2.6	7.6	.6
Hogs:							
1966-70/1961-65	- 4.7	- 10.5	6.1	- 5.8	8.3	17.2	3.3
1971-75/1966-70	22.7	14.7	14.2	23.3	27.6	42.7	24.3
1976-80/1971-75	34.6	18.5	11.5	2.5	8.7	23.6	13.1
Sheep:							
1966-70/1961-65	- 2.5	37.3	- 4.3	- 1.0	1.8	14.2	5.5
1971-75/1966-70	.4	13.2	- 8.1	- 12.2	- 2.4	1.2	-.6
1976-80/1971-75	2.5	- 6.1	13.9	25.4	30.8	5.0	7.9
Poultry:							
1966-70/1961-65	14.2	11.5	4.4	—	6.5	19.3	—
1971-75/1966-70	37.9	23.2	14.8	19.5	11.9	35.0	21.3
1976-80/1971-75	14.5	13.7	10.0	11.1	- 6.3	44.6	13.1

— = Not computed.

¹ Rates of change based on 5-year averages.

Appendix table 15—Livestock per hectare of agricultural land

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
Number							
Cattle:							
1961-65	0.27	0.62	0.72	0.28	0.48	0.32	0.44
1966-70	.23	.61	.79	.29	.54	.34	.47
1971-75	.24	.63	.86	.28	.59	.38	.50
1976-80	.28	.68	.88	.29	.65	.43	.54
Cows:							
1961-65	.10	.28	.33	.12	.29	.14	.22
1966-70	.10	.27	.34	.11	.30	.14	.22
1971-75	.10	.27	.34	.11	.31	.16	.23
1976-80	.11	.27	.34	.12	.31	.17	.23
Hogs:							
1961-65	.41	.82	1.35	.94	.67	.33	.68
1966-70	.38	.75	1.45	.89	.74	.38	.71
1971-75	.46	.87	1.67	1.11	.96	.54	.89
1976-80	.59	1.04	1.86	1.17	1.06	.67	1.01
Sheep:							
1961-65	1.77	.08	.30	.34	.13	.83	.49
1966-70	1.67	.11	.29	.34	.14	.93	.52
1971-75	1.65	.13	.27	.30	.14	.95	.52
1976-80	1.63	.12	.31	.38	.18	.99	.56
Poultry:							
1961-65	3.90	3.98	5.83	NA	3.83	2.65	NA
1966-70	4.31	4.50	6.14	6.88	4.20	3.11	4.48
1971-75	5.84	5.59	7.10	8.30	4.76	4.22	5.47
1976-80	6.43	6.45	7.82	9.41	4.53	6.07	6.22

NA = Not available.

Appendix table 16—Livestock per capita

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
Number							
Cattle:							
1961-65	0.19	0.32	0.27	0.19	0.31	0.25	0.27
1966-70	.16	.30	.29	.19	.33	.26	.28
1971-75	.16	.30	.32	.18	.34	.27	.29
1976-80	.20	.31	.33	.18	.35	.29	.30
Cows:							
1961-65	.07	.14	.12	.08	.19	.11	.14
1966-70	.07	.13	.13	.07	.18	.11	.13
1971-75	.07	.13	.13	.07	.18	.12	.13
1976-80	.08	.13	.13	.07	.17	.12	.13
Hogs:							
1961-65	.29	.43	.50	.65	.44	.26	.42
1966-70	.27	.37	.54	.60	.45	.29	.42
1971-75	.32	.42	.62	.73	.56	.39	.51
1976-80	.42	.48	.70	.73	.58	.46	.56
Sheep:							
1961-65	1.25	.04	.11	.23	.09	.65	.30
1966-70	1.17	.05	.11	.23	.08	.71	.31
1971-75	1.14	.06	.10	.20	.08	.68	.30
1976-80	1.15	.06	.11	.24	.10	.68	.31
Poultry:							
1961-65	2.75	2.06	2.17	NA	2.52	2.07	NA
1966-70	3.03	2.23	2.28	4.63	2.55	2.36	2.67
1971-75	4.05	2.71	2.63	5.44	2.76	3.02	3.15
1976-80	4.54	2.96	2.93	5.90	2.46	4.16	3.46

NA = Not available.

Appendix table 17—Output of animal products

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
1,000 tons							
Total meat: ¹							
1966-70	494	1,009	1,229	982	2,120	802	6,636
1971-75	571	1,218	1,506	1,286	2,656	1,189	8,426
1976-80	739	1,392	1,798	1,463	2,998	1,621	10,010
Beef: ¹							
1966-70	113	351	313	191	613	226	1,808
1971-75	113	403	383	203	702	240	2,045
1976-80	142	424	447	201	869	306	2,389
Mutton: ¹							
1966-70	101	6	12	17	29	60	225
1971-75	99	8	12	17	28	68	231
1976-80	99	6	15	15	29	76	239
Pork: ¹							
1966-70	209	575	827	585	1,351	413	3,961
1971-75	242	683	998	812	1,727	668	5,130
1976-80	349	803	1,198	920	1,726	876	5,873
Poultry: ¹							
1966-70	70	77	76	189	127	103	642
1971-75	117	123	113	255	199	213	1,020
1976-80	149	159	137	326	374	363	1,508

See footnotes at end of table.

—Continued

Appendix table 17—Output of animal products—Continued

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
1,000 tons							
Cow's milk:							
1961-65	853	3,766	5,704	1,825	12,870	2,302	27,320
1966-70	1,193	4,522	7,036	1,902	14,615	2,778	32,047
1971-75	1,358	5,288	7,715	1,882	16,039	3,246	35,528
1976-80	1,650	5,629	8,155	2,281	16,805	4,232	38,752
Eggs:							
1961-65	75	142	193	114	341	114	979
1966-70	89	184	226	155	367	144	1,164
1971-75	99	235	258	194	427	211	1,424
1976-80	123	258	291	246	480	300	1,698

¹ Carcass weight including offals, edible fat, and exports of live animals.

Source: (2).

Appendix table 18—Growth in output of animal products

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
Percent ¹							
Total meat:							
1971-75/1966-70	15.5	20.7	22.6	31.1	25.3	48.3	27.0
1976-80/1971-75	29.5	14.3	19.3	13.7	12.9	36.3	18.8
Beef:							
1971-75/1966-70	-.4	14.8	22.3	6.3	14.5	6.3	13.1
1976-80/1971-75	26.0	5.1	16.6	-.9	23.7	27.7	16.9
Mutton:							
1971-75/1966-70	-2.8	26.7	-3.3	0	-1.4	14.1	2.8
1976-80/1971-75	0	-23.7	28.8	-10.8	1.4	11.5	3.5
Pork:							
1971-75/1966-70	15.7	18.8	20.6	38.8	27.8	61.8	29.5
1976-80/1971-75	44.3	17.5	20.1	13.4	0	31.0	14.5
Poultry:							
1971-75/1966-70	67.0	61.1	48.2	35.0	56.7	105.8	58.8
1976-80/1971-75	27.0	28.8	21.0	28.0	88.1	70.5	47.8
Cow's milk:							
1966-70/1961-65	39.8	20.1	23.4	4.2	13.6	20.7	17.3
1971-75/1966-70	13.8	17.0	9.6	-1.1	9.7	16.8	10.9
1976-80/1971-75	21.5	6.4	5.7	21.2	4.8	30.4	9.1
Eggs:							
1966-70/1961-65	17.8	29.4	17.1	36.0	7.6	26.1	18.9
1971-75/1966-70	11.3	27.6	14.1	25.6	16.4	46.9	22.3
1976-80/1971-75	24.9	9.9	12.7	26.6	12.5	41.9	19.3

¹ Rates of change based on 5-year averages.

Appendix table 19—Livestock productivity indicators

Commodity and period averages	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania	Total
<i>Kilograms¹</i>							
Pork per hog: ²							
1966–70	94	108	90	95	93	73	92
1971–75	89	112	95	107	93	83	96
1976–80	95	111	103	118	85	88	97
Total meat per capita:							
1966–70	59	70	72	96	66	41	65
1971–75	66	84	89	123	80	57	80
1976–80	84	92	107	137	86	74	92
Total meat per hectare: ³							
1966–70	84	142	194	142	108	54	109
1971–75	95	172	240	188	137	80	140
1976–80	119	200	286	218	157	108	166

¹ Carcass weight.

² Pork per annual average hog inventory at beginning of year.

³ Meat per hectare of agricultural land.

Appendix table 20—Milk and egg productivity

Commodity and year	Bulgaria	Czecho-slovakia	GDR	Hungary	Poland	Romania
<i>Liters</i>						
Milk per cow:						
1960	1,402	1,806	2,566	2,190	2,060	1,327
1965	1,689	1,954	2,892	2,150	2,186	1,497
1970	2,147	2,488	3,214	2,420	2,384	1,559
1975	2,198	2,803	3,689	2,446	2,600	1,636
1980	2,579	3,089	3,805	3,557	2,730	1,901
<i>Number</i>						
Eggs per hen:						
1960	91	104	135	83	94	85
1965	98	141	143	92	94	88
1970	112	175	168	113	100	93
1975	126	218	195	151	103	139
1980	144	228	205	151	126	160

Sources: Statistical yearbooks of the respective countries.

Appendix table 21—Agricultural trade

Item and year	Bulgaria	Czecho- slovakia	GDR	Hungary	Poland	Romania	Total
<i>Million dollars</i>							
Agricultural exports:							
1971	390	213	66	594	442	394	2,054
1972	441	228	94	762	653	531	2,709
1973	455	265	125	1,092	875	752	3,564
1974	455	405	176	1,250	927	859	4,072
1975	584	388	173	1,440	874	884	4,343
1976	955	329	333	1,453	978	929	4,977
1977	1,037	342	325	1,750	1,024	1,275	5,753
1978	1,068	401	406	1,786	1,080	1,275	6,016
1979	1,239	531	451	2,105	1,201	1,169	6,696
1980	1,379	628	512	2,004	1,137	1,387	7,047
Agricultural imports:							
1971	160	857	838	405	723	242	3,225
1972	152	913	1,017	411	766	300	3,559
1973	230	1,180	1,208	538	1,138	459	4,753
1974	437	1,392	1,510	799	1,483	745	6,366
1975	527	1,319	1,576	807	1,604	763	6,596
1976	504	1,462	1,880	938	1,892	881	7,557
1977	453	1,640	1,895	1,156	2,039	810	7,993
1978	500	1,640	2,034	1,163	2,294	863	8,494
1979	600	2,164	2,212	1,203	2,551	1,164	9,894
1980	610	2,156	2,556	1,070	3,092	1,409	10,893
Agricultural trade balance:							
1971	230	−644	−772	189	−281	152	−1,126
1972	289	−685	−923	351	−113	231	−850
1973	225	−915	−1,083	555	−263	293	−1,188
1974	18	−988	−1,334	451	−555	114	−2,294
1975	57	−931	−1,403	633	−731	122	−2,253
1976	451	−1,133	−1,547	515	−914	48	−2,580
1977	584	−1,298	−1,570	594	−1,015	465	−2,240
1978	568	−1,239	−1,628	623	−1,214	412	−2,478
1979	639	−1,633	−1,761	902	−1,350	5	−3,198
1980	769	−1,528	−2,044	934	−1,955	−22	−3,846

Source: (5).

Appendix table 22—Total trade

Item and year	Bulgaria	Czecho- slovakia	GDR	Hungary	Poland	Romania	Total
<i>Million dollars</i>							
Exports:							
1971	2,182	4,180	5,076	2,500	3,872	2,101	19,911
1972	2,627	9,915	6,184	3,292	4,932	2,599	24,549
1973	3,301	6,035	7,521	4,433	6,374	3,698	31,362
1974	3,836	7,053	8,748	5,230	8,315	4,874	38,056
1975	4,691	8,356	10,088	6,091	10,283	5,341	44,850
1976	5,392	9,035	11,361	4,934	11,017	6,138	47,877
1977	6,351	10,302	12,024	5,832	12,265	7,021	53,795
1978	7,478	11,747	13,267	6,345	14,114	8,077	61,028
1979	8,869	13,198	15,063	7,938	16,249	9,724	71,041
1980	10,372	14,891	17,312	8,677	16,997	12,230	80,479
Imports:							
1971	2,120	4,010	4,981	2,990	4,038	2,103	20,242
1972	2,567	4,662	5,905	3,154	5,335	2,616	24,239
1973	3,266	6,137	7,854	3,919	7,814	3,468	32,458
1974	4,326	7,532	9,646	5,576	10,482	5,144	42,706
1975	5,408	9,081	11,290	7,176	12,536	5,342	50,833
1976	5,626	9,706	13,196	5,528	13,867	6,095	54,018
1977	6,393	11,187	14,334	6,523	14,616	7,018	60,071
1978	7,651	12,565	14,572	7,902	16,089	8,910	67,689
1979	8,514	14,262	16,214	8,674	17,584	10,916	76,164
1980	9,650	15,148	19,082	9,235	19,089	13,201	85,405
Balance:							
1971	62	170	95	-490	-166	-2	-331
1972	60	253	279	138	-403	-17	310
1973	35	-102	-333	514	-1,440	230	-1,096
1974	-490	-479	-898	-346	-2,167	-270	-4,650
1975	-717	-725	-1,202	-1,085	-2,253	-1	-5,983
1976	-233	-671	-1,835	-594	-2,850	43	-6,141
1977	-42	-885	-2,310	-691	-2,351	3	-6,276
1978	-173	-818	-1,305	-1,557	-1,975	-833	-6,661
1979	355	-1,064	-1,151	-736	-1,335	-1,192	-5,123
1980	722	-257	-1,770	-558	-2,092	-971	-4,926

Source: (27).

Appendix table 23—Value of major agricultural imports, Eastern Europe

Product	SITC code	1971	1978	1979	1980
<i>Million dollars</i>					
Agricultural imports, total	*	3,225	8,494	9,894	10,893
Live animals	00	58	127	125	119
Meat and meat preparations	01	200	198	214	485
Dairy products and eggs	02	76	51	87	82
Cereals and preparations	04	471	1,986	2,619	3,053
Fruits and vegetables	05	234	809	830	763
Sugar and honey	06	174	284	405	451
Coffee, tea, and spices	07	190	1,123	1,067	1,108
Feeding stuffs	08	229	894	1,028	1,131
Beverages	11	133	333	356	301
Tobacco	12	114	249	309	232
Oilseeds	22	69	219	341	261
Natural rubbers and gums	23	79	238	279	317
Fibers	26	595	1,184	1,355	1,477
Animal oils, fats, greases, and vegetable oils	4	99	301	305	284
Other agricultural imports	*	504	498	574	829

* = Not applicable.

Source: (5).

Appendix table 24—Grain imports

Commodity and country	1971–75 average	1976	1977	1978	1979	1980
1,000 tons						
Total grains:						
Bulgaria	327	439	194	648	908	692
Czechoslovakia	1,564	2,187	1,207	936	2,085	1,980
GDR	3,190	5,067	2,733	3,498	3,717	4,465
Hungary	502	233	314	428	326	153
Poland	3,543	6,131	5,754	7,366	7,338	7,811
Romania	779	1,670	1,328	1,195	2,127	2,062
Total	9,905	15,727	11,530	14,071	16,501	17,163
Wheat:						
Bulgaria	66	32	119	59	379	30
Czechoslovakia	955	689	374	257	736	537
GDR	1,570	1,691	1,100	687	811	476
Hungary	94	33	4	INS	2	1
Poland	1,608	2,311	2,599	2,311	2,927	3,466
Romania	250	989	540	300	800	630
Total	4,543	5,745	4,736	3,614	5,655	5,140
Barley:						
Bulgaria	108	1	3	62	299	1
Czechoslovakia	110	158	272	20	11	169
GDR	331	796	581	806	1,161	564
Hungary	278	253	31	95	287	84
Poland	1,048	742	1,268	2,413	1,498	1,130
Romania	149	20	23	150	165	60
Total	2,024	1,970	2,178	3,546	3,421	2,008
Corn:						
Bulgaria	136	375	61	519	225	653
Czechoslovakia	373	1,260	471	590	1,206	1,181
GDR	1,179	2,346	940	1,229	1,201	3,161
Hungary	56	20	248	284	INS	30
Poland	537	2,035	1,401	1,807	2,128	2,553
Romania	301	102	300	310	920	1,280
Total	2,582	6,138	3,421	4,739	5,680	8,858
Other coarse grains: ¹						
Bulgaria	13	24	INS	INS	INS	INS
Czechoslovakia	54	INS	6	INS	46	20
GDR	65	192	67	733	500	220
Hungary	61	14	4	20	16	15
Poland	283	924	429	756	697	569
Romania	26	501	427	373	175	35
Total	502	1,655	933	1,882	1,434	859
Rice:						
Bulgaria	4	7	9	8	5	8
Czechoslovakia	73	80	84	69	86	73
GDR	46	42	45	43	44	44
Hungary	14	13	27	29	21	23
Poland	67	119	57	79	88	93
Romania	52	58	38	62	67	57
Total	256	319	260	290	311	298

INS = Insignificant.

¹ Rye, oats, and grain sorghum.

Source: (5), and statistical yearbooks of the respective countries.

Appendix table 25—Imports of oilseeds and oilmeal

Commodity and country	1971-75 average	1976	1977	1978	1979	1980
<i>1,000 tons</i>						
Oilseeds: ¹						
Bulgaria	INS	1	1	INS	36	6
Czechoslovakia	135	148	149	116	170	91
GDR	137	38	40	61	51	84
Hungary	12	3	2	INS	22	15
Poland	132	84	10	131	211	279
Romania	18	221	116	310	329	279
Total	434	495	318	618	819	754
Oilseed meal:						
Bulgaria	201	256	214	181	136	184
Czechoslovakia	527	671	592	606	593	753
GDR	789	875	998	941	986	943
Hungary	441	541	594	692	622	620
Poland	665	1,024	1,051	1,088	1,274	1,361
Romania	177	320	240	270	270	385
Total	2,800	3,687	3,689	3,778	3,881	4,246

INS = Insignificant.

¹ Flaxseed, rapeseed, soybeans, and sunflowerseed.

Sources: (2, 5), and statistical yearbooks of respective countries.

Appendix table 26—Share of grain, soybean, and oilseed meal imports by source, Eastern Europe

Source	Grain		Soybeans		Oilseed meal	
	1971-75 average	1976-80 average	1971-75 average	1976-80 average	1971-75 average	1976-80 average
<i>Percent</i>						
Argentina	INS	INS	INS	3.9	2.1	1.8
Brazil	*	*	INS	INS	14.9	35.9
Canada	4.3	9	*	*	*	*
Eastern Europe	7.7	6.7	INS	3.5	*	*
European Community	12	12.6	*	*	24.9	8.5
India	*	*	*	*	18.2	12.2
Other Western Europe ¹	5.3	5.9	*	*	*	*
United States	27.2	43.8	77.4	79.9	25.2 ²	33.8 ²
USSR	38.1	3.9	*	*	*	*
Unidentified	5.4	18.1	22.6	12.7	14.7	7.8

* = Not applicable. INS = Insignificant.

¹ Austria, Denmark (1971-72), Greece, Spain, Sweden, Switzerland, United Kingdom (1971-72).

² Soybean meal.

Source: Statistical yearbooks of the respective countries.

Appendix table 27—Grain utilization

Item and year	Bulgaria	Czecho- slovakia	GDR	Hungary	Poland	Romania	Total
1,000 tons							
1971–75 average:							
Grain production	7,326	9,349	8,678	11,364	20,939	14,814	72,470
Net grain imports	–94	1,487	2,834	–601	3,327	–142	6,811
Total grain consumption ¹	7,232	10,836	11,512	10,763	24,266	14,672	79,281
Percent							
Imports as a percentage of consumption	*	13.7	24.6	*	13.7	*	8.6
1,000 tons							
1976–80 average:							
Grain production	7,849	10,059	9,038	12,551	19,495	19,383	78,375
Net grain imports	147	1,613	3,519	–745	6,846	116	11,496
Total grain consumption ¹	7,996	11,672	12,557	11,806	26,341	19,499	89,871
Percent							
Net imports as a percentage of consumption	1.8	13.8	28	*	26	1	12.8

* = Not applicable.

¹ Includes feed, food, industrial use, seed, and waste.

Appendix table 28—Selected agricultural imports

Commodity and country	1971–75 average	1976	1977	1978	1979	1980
1,000 tons						
Vegetable oil, edible:						
Bulgaria	INS	2	INS	INS	INS	2
Czechoslovakia	50	53	44	50	51	21
GDR	116	104	111	132	106	112
Hungary	19	17	15	14	12	9
Poland	66	87	79	58	64	103
Romania	3	10	6	3	4	20
Total	254	273	255	257	237	267
Cotton:						
Bulgaria	58	48	61	55	56	64
Czechoslovakia	111	95	117	96	122	114
GDR	93	79	102	86	84	99
Hungary	76	87	68	99	96	117
Poland	152	145	176	159	163	173
Romania	102	108	101	119	109	120
Total	592	562	625	614	630	687
Hides and skins:						
Bulgaria	7	7	4	5	7	5
Czechoslovakia ¹	52	49	50	53	(53)	53
GDR	17	15	17	15	19	19
Hungary	26	26	38	38	32	34
Poland	52	35	45	44	42	43
Romania	25	49	36	40	54	43
Total	179	181	190	195	207	197
Meat and meat products: ²						
Bulgaria	20	17	11	8	3	5
Czechoslovakia	43	22	31	23	22	31
GDR	39	20	30	21	20	31
Hungary	18	27	10	6	10	10
Poland	59	46	104	33	2	54
Romania	22	11	3	36	55	89
Total	201	143	189	127	112	220

See footnotes at end of table.

—Continued

Appendix table 28—Selected agricultural imports—Continued

Commodity and country	1971-75 average	1976	1977	1978	1979	1980
<i>1,000 tons</i>						
Sugar: ³						
Bulgaria	241	239	214	226	224	238
Czechoslovakia	140	109	64	80	94	99
GDR	295	189	234	213	223	188
Hungary	188	151	91	59	80	40
Poland	40	16	30	60	62	124
Romania	80	129	222	NA	123	87
Total	984	833	855	NA	806	776
Tobacco:						
Bulgaria	8	4	5	8	8	12
Czechoslovakia	17	15	16	29	20	26
GDR	20	16	18	19	20	26
Hungary	9	7	9	6	4	7
Poland	5	11	7	8	13	23
Romania	4	2	1	1	INS	INS
Total	63	55	56	71	65	94

NA = Not available.

() = Estimate.

INS = Insignificant.

¹ Converted from pieces to metric tons at 22 kg per piece.

² Includes poultry meat.

³ Raw basis.

Sources: (2, 5), and statistical yearbooks of the respective countries.

Appendix table 29—Value of major agricultural exports, Eastern Europe

Product	SITC code	1971	1978	1979	1980
<i>Million dollars</i>					
Agricultural exports, total	*	2,045	6,016	6,696	7,047
Live animals	00	273	654	779	621
Meat and meat preparations	01	449	1,402	1,763	1,856
Dairy products and eggs	02	110	302	324	364
Cereals and preparations	04	82	721	569	866
Fruits and vegetables	05	352	854	983	494
Sugar and honey	06	82	210	183	297
Coffee, tea, and spices	07	10	29	31	24
Feeding stuffs	08	9	47	50	31
Beverages	11	213	553	639	548
Tobacco	12	120	204	250	249
Oilseeds	22	34	50	85	47
Fibers	26	24	27	34	40
Animal fats, oils, greases, and vegetable oils	4	87	199	231	168
Other agricultural exports	*	200	764	775	1,432

* = Not applicable.

Source: (5).

Appendix table 30—Selected agricultural exports

Commodity and country	1971-75 average	1976	1977	1978	1979	1980
1,000 tons						
Total grains:						
Bulgaria	421	452	446	202	396	651
Czechoslovakia	77	197	34	33	14	56
GDR	356	386	329	339	382	440
Hungary	1,103	1,693	1,035	874	645	932
Poland	216	70	22	6	67	6
Romania	921	1,633	2,052	1,853	629	1,720
Total	3,094	4,431	3,918	3,307	2,133	3,805
Oilseeds: ¹						
Bulgaria	46	11	30	13	40	15
Czechoslovakia	2	1	6	INS	INS	INS
GDR	3	13	15	10	22	INS
Hungary	39	42	57	90	133	76
Poland	36	173	78	4	INS	INS
Romania	26	5	11	1	2	INS
Total	152	245	197	118	197	91
Vegetable oil, edible:						
Bulgaria	22	23	21	7	15	13
Czechoslovakia	2	1	3	2	INS	INS
GDR	INS	INS	INS	INS	INS	INS
Hungary	42	39	50	47	49	95
Poland	46	76	101	61	39	7
Romania	142	87	158	131	146	84
Total	254	226	333	258	249	199
Meat and meat products: ²						
Bulgaria	73	118	106	98	102	117
Czechoslovakia	26	12	10	22	60	54
GDR	61	134	121	152	134	122
Hungary	182	210	293	265	310	347
Poland	197	157	142	153	167	162
Romania	107	165	194	158	225	191
Total	646	796	866	848	998	993
Sugar: ³						
Bulgaria	7	INS	9	INS	INS	INS
Czechoslovakia	238	72	171	300	249	186
GDR	134	67	92	82	77	94
Hungary	5	1	2	12	35	106
Poland	226	354	272	285	105	48
Romania	65	INS	174	92	7	87
Total	675	494	720	771	473	521
Tobacco:						
Bulgaria	67	70	70	62	72	73
Czechoslovakia	2	1	INS	2	INS	INS
GDR	2	2	2	2	2	3
Hungary	3	1	1	1	1	3
Poland	11	10	10	9	9	9
Romania	5	10	8	6	5	8
Total	90	94	91	82	89	96

INS = Insignificant.

¹ Flaxseed, rapeseed, soybeans, and sunflowerseed.² Includes poultry.³ Raw basis.

Sources: (2, 5), and statistical yearbooks of the respective countries.

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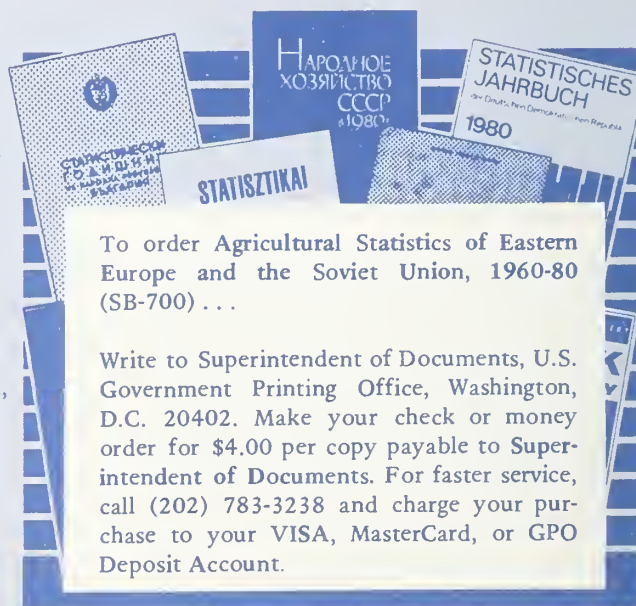
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